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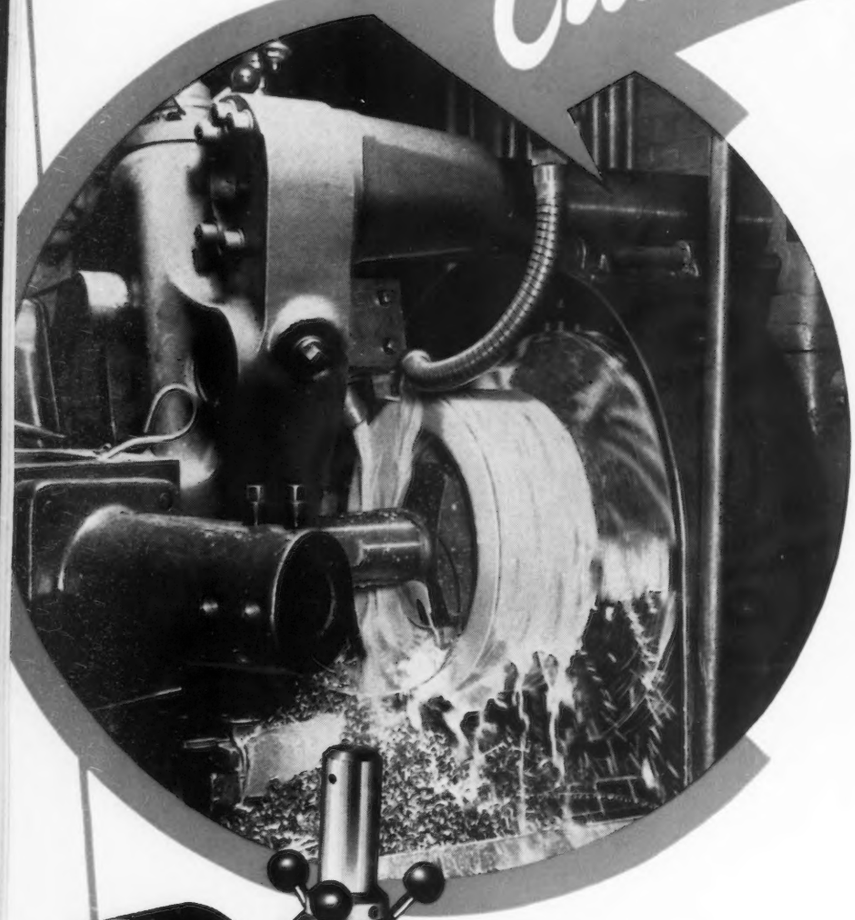

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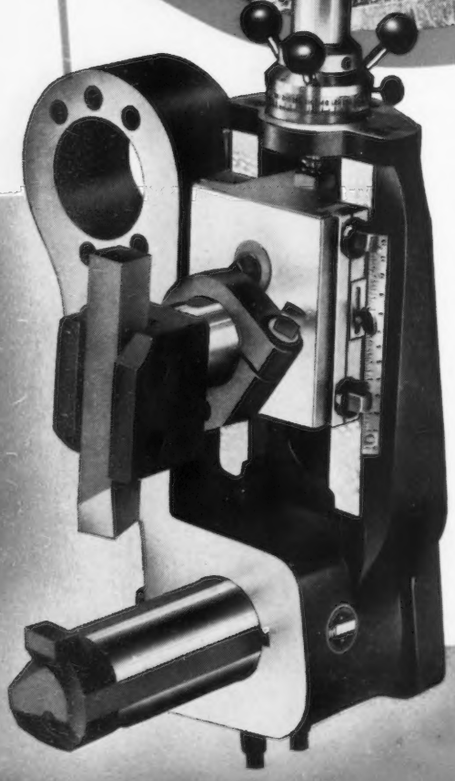

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JULY 24, 1941

VOL. 148, NO. 4

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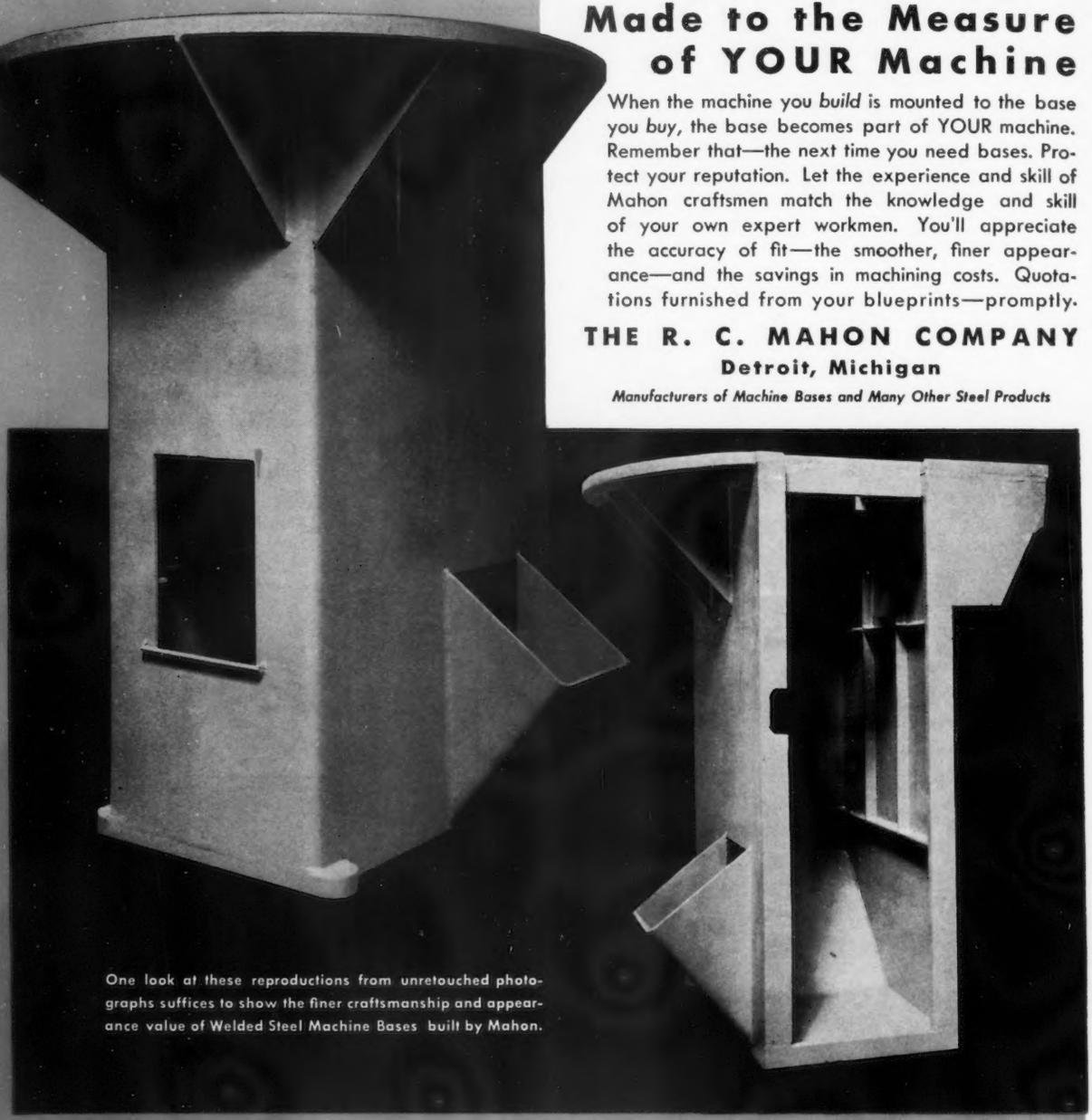

One look at these reproductions from unretouched photographs suffices to show the finer craftsmanship and appearance value of Welded Steel Machine Bases built by Mahon.

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The Iron Age

JULY 24, 1941

ESTABLISHED 1855

The Power House

THE heart of a manufacturing plant is the power house and the heart of the power house is the switchboard of the control room. It is here that response is immediately made to the needs of the many diversified departments. Through the master hand of electrical control, the power demands of machine departments, foundry, forge shops and dozens of other centers of specialized activity are immediately met with a flexibility that is so complete that it becomes commonplace and is taken for granted.

Control of power is the cardinal and basic necessity for getting things done. As I said, we take it for granted. Yet underneath it lies not only an adequate organization of the physical means of distributing power but beyond and above that, its control by someone who knows what is going on and what is needed from moment to moment.

Imagine what would happen to a manufacturing schedule if this knowledge and control were lacking. It would go "haywire" in a moment. The finest distribution system that would be made would be utterly useless with a "greenhorn" at the control board.

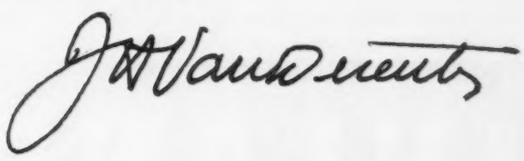
That is something for the American people to think about in connection with the progress of our defense program.

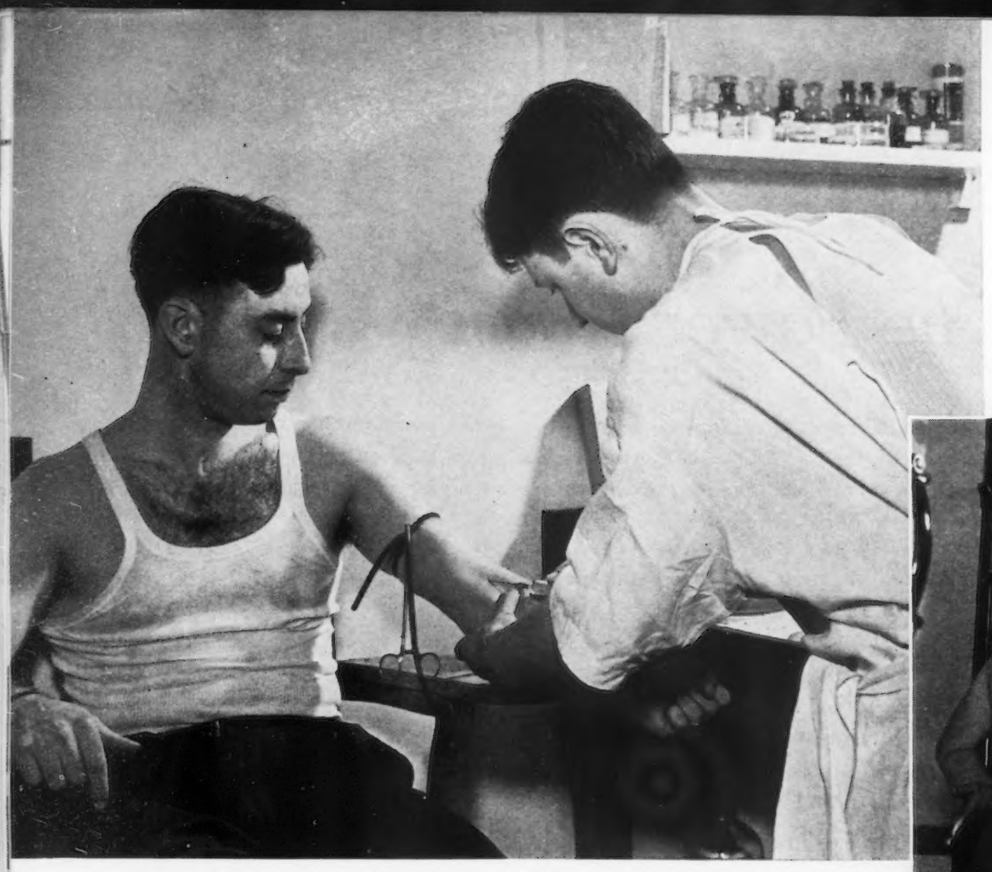
In this great program, our critical source of power is manpower. It takes a man to operate a machine. So our potential is the amount of man-hours available in this country for making what we need. The control of this manpower and its distribution to the necessary activities in accordance with their importance correspond to what goes on in the control room of a power house.

If we crowd too much manpower into one line of activity, we penalize another. And that other may be just as vital to the outcome of our efforts as any.

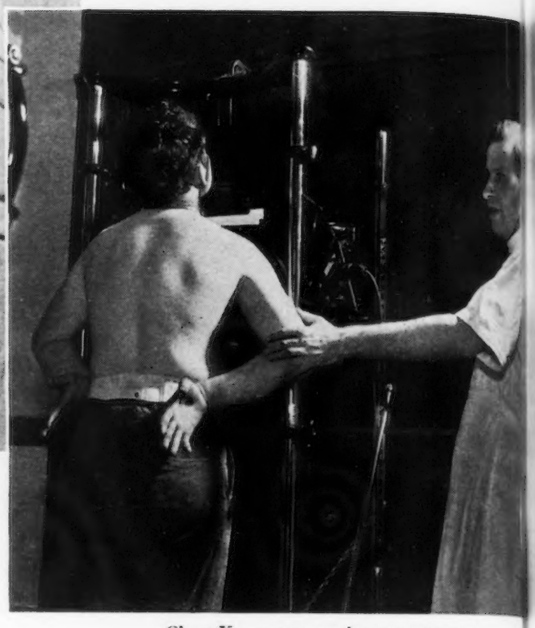
Today, the tendency is to see nothing but munitions. Airplanes and tanks and guns alone never won a war. Agricultural machinery with which to obtain food to feed armies is just as important as motorized army equipment. Gears and pinions and chain drive belts, hardware, electric motors, mechanics' tools are all part of a balanced defense effort and essential to it even though they cannot be directly related to a defense order.

We have the finest equipment and the best resources in the world to make more of anything than any other people, anywhere. But what we lack is an experienced hand in the control room.





Every employee who enters the clinic is given a thorough blood test.



Chest X-rays are an important part of the Inland clinic examination.

Inland Clinic

Guards Employees' General Health

Each year thousands of employees take advantage of the Inland general health examination clinic. This clinic is a vital factor in reducing time lost due to illness, which is at least seven times the loss resulting from injuries.

When an employee enters this modern and completely equipped clinic he is given a thorough physical examination, including blood tests and X-rays. If this examination discloses a condition indicating chronic disease, further special tests are made. This man then may go to his doctor with the report of the Inland clinic. The diagnosis is accurate and complete, and correct treatment can be started at once.

Benefits of the Inland clinic are many. Inland employees need not harbor the fear of suspected disease, their earning power is kept more stable, improved physical condition makes them more alert, and liability of accidents is reduced. Further, if the clinic examination shows an employee to be physically unfitted for his job, he is kept on the payroll by transfer to work within his capacity. Another benefit is the relief from mental strain due to illnesses at home, because Inland employees may take such troubles to the clinic for expert advice.

This Inland clinic, by building up the general health level, helps employees retain their full earning power, provides them with the type of work suited to their physical condition, and adds many years to their work life. This clinic helps Inland keep skilled men on the job, and in so doing makes Inland employees more valuable to their families and their community.

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Metallographic Examination Standardized

o o o

Translated by
C. M. COSMAN
The Iron Age, New York

o o o

—The highly interesting study summarized herein appeared recently in Germany, written by Dr. H. Diergarten, head of the research laboratories of Vereinigte Kugellagerfabriken, A.G., Schweinfurth. Certainly there is a place in this country for a technique standardizing microscopic testing of metals. Perhaps this article can serve as a stimulant leading to collaboration of various members of the industry, which in turn would prove invaluable to producers and consumers alike.

o o o

GERMANY in her present war is handicapped by the lack of raw materials for the metal industries. There is an acute shortage of nickel, for instance, and there is a general scarcity of materials which are usually considered absolutely essential in the production of high quality alloy steels. This situation has led to the development of steels which, with a lower alloy content, have to do the work of heavy duty alloy steels. The primary demand in this case is a closer control of production and a greater accuracy and adaptation of testing methods.

H. Diergarten, D. Eng., head of the laboratories of the Vereinigte Kugellagerfabriken, A. G., Schweinfurt, a leading ball and roller bearing producer, has shown in a report to the Verein Deutscher Ingenieure a new system of organized testing and reduction in the relevant information about a material—especially in steel—to numbers; this not only facilitates tabulation and correlated investigations, but also inter-departmental collaboration, as for instance, between works and laboratories. The following paragraphs describe this very interesting method, and, also some of the results claimed to have been achieved in the works at Schweinfurt.

Modern designing requires the engineer to shape each part to fit its purpose only and to avoid all waste. Since, therefore, parts are to be designed with the strictest material economy, improvements in shaping and testing are necessary to assure that parts are equal to their job. It is particularly important to probe the homogeneity and fatigue values of materials. In the choice of materials the ultimate application of the part and the surface condition are of the greatest importance. The surface especially can frequently have a greater influence than variations in chemical or mechanical values.

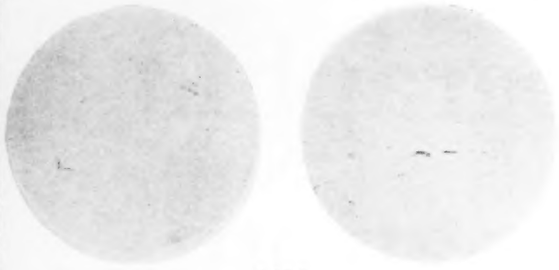
For success in mass production, it is imperative to have quality of product and efficiency of manufacture; it is also necessary to specify the most suitable material and to test continuously its homogeneity and consistency of treatment.

When the various testing methods are considered, it is possible to arrive at a broad division by classing them as numerically definable and undefinable. Mechanical and some of the physical testing methods (magnetic and conductivity tests) yield results that can be expressed in numbers. They conform to fixed mathematical conceptions, are performed in a standard way and will be useful only insofar as they represent stresses and strains that will be exerted on the material under service conditions. Chemical analysis, on the other hand, shows a permanent quality of the material. It is an indispensable test. Technological testing processes are very useful as a speedy means of checking during manufacture. The visual methods, metallography, X-ray investigation and magnaflux tests, afford the most useful means of interpreting the state of a material, to assess its usefulness and to prescribe a treatment which will fit it for the job. These visual methods, however, can be under-

Sulphide Slag Inclusions

BRITTLE SLAGS, DISSOLVED

BALL SHAPE



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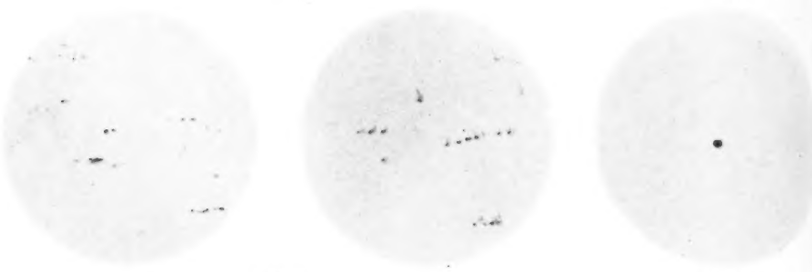
1.02.1 1.03.1

1.01.2



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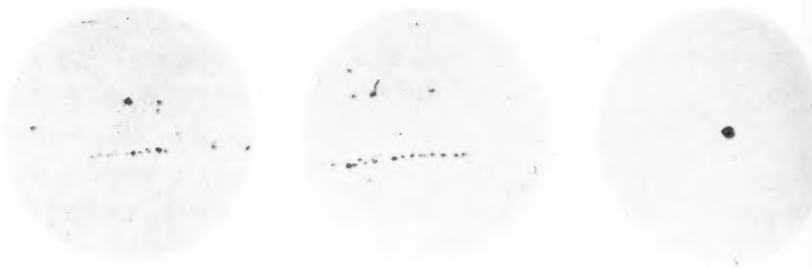

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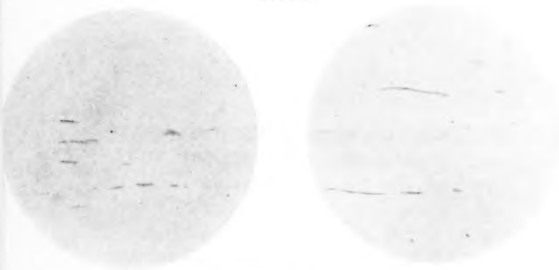

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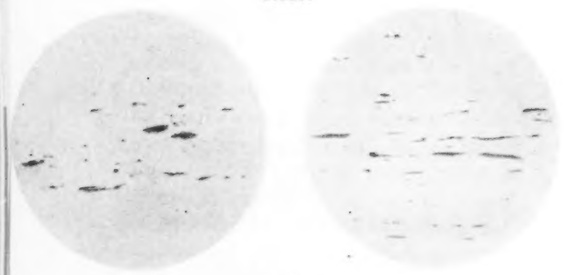

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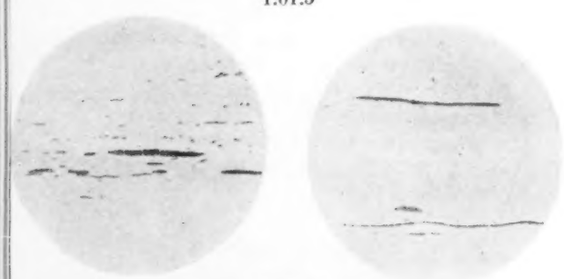

1.01.6

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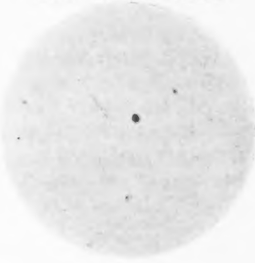
Oxide Slag

OVAL SHAPE	LINE SHAPE	DOUBLE LINE SHAPE	MULTI-POINT SHAPE
			
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			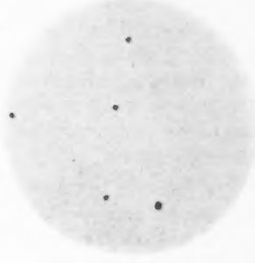
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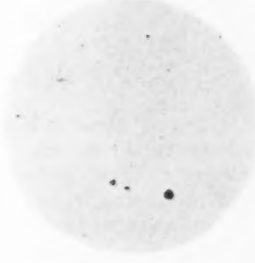
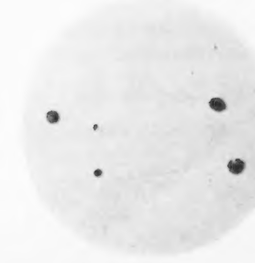
			
1.04.3	1.05.3	1.06.3	1.07.3
1.04.4	1.05.4	1.06.4	1.07.4
1.04.5	1.05.5	1.06.5	1.07.5
			
1.04.6	1.05.6	1.06.6	1.07.6

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STANDARIZATION and schematization of inclusions in steel. The application of these data will make possible the numerical definition of micrographic information concerning frequency, kind and shape of inclusion, and thus considerably simplify the classification of steels. At 100 diameters; shown herein one-half size.

o o o

stood only by the specialist, and their interpretation needs both theoretical education and practical experience.

While certain tests, such as the hardness or tensile tests, can be read off the machine easily and communicated to the works as a figure, visual tests are painstaking to report and not easy to interpret. To alleviate this difficulty, *a standard metallographic series has been designed which expresses visual information numerically.* With the aid of this the heat treating shop, say, can aim at a certain metallographic number, as they are aiming at a certain Brinell hardness. Also, and of great importance, further simplification is obtained in producer-consumer relations.

For some items, as for instance inclusions, such standard metallographic series (designated herein as SMS) has existed for some time, as in the Fox inclusion count. The present system, however, is of value because it extends this scheme to the whole field of metallography and shows the way even beyond.

On judging materials their microscopic conditions should be considered. Knowledge of steel making processes and the metallurgical interpretation for subsequent treatment will make possible easier and more consistent production of high quality parts in the steel consuming industries. Precise data are desired for the various materials.

The quality of steel is essentially determined by its chemical composition, but quality within this class depends on a variety of factors:

Origin of raw materials: Pig iron, scrap, slag.

Chemical composition: Percentages of C, Ni, Cr, W, Mo, etc.

Smelting method: Kind of furnace, method of preparation, method of casting.

Fabrication: Rolling, forging, pressing, drawing, normalizing, hardening, tempering.

Further manufacture: Shaping, turning, heat treatment, etc.

The most important of these is the melting method. Distinction between straight carbon steels is based on the origin from the acid or basic open hearth, between alloy steels originating in the acid open hearth or electric furnace, and between special steel originating in the crucible or induction furnace.

Properties Vary Considerably

Steels show a fundamental property determined by raw materials, furnace and smelting process. Structural alloy steels have better fatigue properties if melted in the acid open hearth, and silicon-manganese steels have better elongation perpendicular to grain flow. The same steel made in the basic electric furnace will have up to tenfold N_2 content.

Often there are considerable differences between casts, which are chemically identical and technically and mechanically equally treated. It is impossible to grasp these distinctions through any testing methods other than metallographical investigations.

Currently the metallographist is a highly trained and paid man who should not be used to perform functions of routine testing. But, the standard metallographic series, SMS, will make it possible for the untrained man to perform these tests quickly and efficiently, the metallographist being able to design and extend series as they are needed for special requirements in the works.

The standard metallographic series has been compiled to give information regarding a variety of properties and the extent to which these are encountered in the material. Figures are designed to run in three groups: The first index gives a blanket classification, the second a subdivision within the group, and the last gives the degree of frequency or volume of the occurrence of the phenomenon defined by the preceding numbers. Thus, 1.02.3 means, 1 = blanket definition: inclusions; 1.02 = specific class: brittle oxide inclusions; 1.02.3 = strength or frequency 3, referred to as value number. The selection of the system as proposed is as follows:

1.00.0 = Slag inclusions in steel.

2.00.0 = Carbide segregations in structural and tool steels.

3.00.0 = Normalizing and annealing structure of steel (grain size, line structure, etc.).

4.00.0 = Hardening structure of structural and tool steels.

5.00.0 = Gray iron, cast steel.

6.00.0 = Brass and bronze.

6.50.0 = Aluminum and aluminum alloys.

7.00.0 = Other non-ferrous metals.

8.00.0 = Surface condition of steel and iron.

9.00.0 = Surface condition of other metals.

Relations between SMS value numbers and practical results, i.e., behavior of the steel during fabrication and use, must be obtained through extensive observations and correlations, and tolerances must be established. To develop such data for the whole metal working industry should be a task that can be undertaken if SMS are set up and generally accepted as a basis for data. This could result in the avoidance of very wasteful parallel experiments and in improvements of quality and economical fabrication.

TABLE I

Time Required for Microscopical Examination to Determine Average Slag Content of Section

Length of Section, mm. (width approximately 10 mm.)	——Time of Investigation, Min.—— When inclusions are fine and evenly distributed	When inclusions are coarse and solitary
Up to 40	1.0	1.0
Up to 80	1.5	2.0
Up to 120	2.0	3.0

Material Investigated

Unalloyed structural steels are supplied usually in the form of billets, booms, slabs, shapes, sheets, strip, etc. The standard (DIN) number (as per instance, SAE) defines their quality and composition. These steels are not usually investigated metallographically. Since, however, difficulties occurred frequently in German works during fabrication, these steels were examined metallographically in considerable detail. Non-metallics were classified according to size, kind, and frequency by SMS 1.00.0 (See Fig. 1) and grain size was also evaluated and a corresponding series established.

Alloyed structural steels were also tested for inclusions, grain size and line structure. They were supplied in rods 20 to 60 mm. in diameter.

Free cutting steels came in rods 4 to 30 mm. in diameter from the basic open hearth. In order to estimate in advance the cutting properties, tensile strength, hardness,

elongation and grain size, the distribution and frequency of segregational inclusions were taken into account. Steels found thus theoretically acceptable on the basis of SMS proved to be satisfactory during fabrication, while steels of equal mechanical performance as regards tensile strength and hardness, but without metallographic tolerances, were often unsatisfactory in service.

Unalloyed and alloyed tool steels, both hypo and hyper-eutectoid, from all steel furnaces, were also investigated for use in a wide variety of tool applications.

The ultimate application of a material determines the degree of purity required. In a few instances inclusions are desired, as in welding and in spring and free cutting steels; in others, slag inclusions are without influence and may be neglected in testing. But, in most cases in which the steel is called to do heavy duty, slag inclusions must be kept low. This is especially true for the building of parts, in the production of gears, motors, roller bearings, etc. If, for instance, a fair sized slag inclusion should get into a surface subjected to wear, then it will break out under pressure. The hollow left behind will result in stress concentrations and most likely ultimate breakdown of the part.

Conditions for the SMS must be standardized so that repeatable and objective results can be obtained. For valid results a sufficient number of tests must be performed. Therefore, from each batch of rods a certain number are selected of which the end pieces are cut off. No less than ten test pieces should be prepared from one consignment of steel of uniform quality and dimension. In a steel plant, where the position of the bars in the ingot are known, a smaller number of tests is permissible. Test pieces must be hardened to obviate mistakes in the processing of the test pieces. Alinement of the tested surface with the direction of deformation must be insured, since otherwise a correct estimate of the size of inclusions is made impossible. The optimum polished surface is not required at the 100-diameter magnification at which the series of investigations are performed. If the operator is sufficiently trained, he can estimate both slag inclusions and carbide segregations on mildly etched specimen of some steels.

A magnification of 100 diameters was found most suitable together with a field of vision of 75 ± 5 mm. diameter on the ground glass screen. If inclusions are evenly dispersed, about 1 to 1½ min. will suffice to evaluate the test piece. If, however, there are solitary large inclusions, then with the time of searching the likelihood of finding more will increase—thus, the time of search must be limited. (See Table I.)

Ed. Note:—Next week this article will be concluded with data on SMS evolved bearing on inclusions, carbide segregation, structural phenomena, and surface classification.

Metal Powders Compressed in Vacuum

ACCORDING to the Hardy Metallurgical Co., the compression of metal powders involves several factors which work against good compression. Among the foremost obstacles are included, (1) the inability of metal powders to flow freely, (2) the entrapment of air or gases during compression, (3) the development of stratification or planes of weakness in the compact, and (4) the high compression ratios which are necessary due to the low density of the uncompressed powder as compared to the compressed object.

Of considerable interest is that much has been accomplished in overcoming these difficulties by evacuating the powder before compression and by evacuating the mold into which the powders are pressed. Both the hopper from which the powders flow and the mold into which the powders are fed are partially evacuated. Many powders which will not flow, or which flow but slowly, under atmospheric conditions, will flow readily when air or gases present between the powder particles have been removed by evacuation. This improved flow permits the powder to fill the mold more rapidly, thus speeding operation. It also causes the powder to more completely fill the mold cavities and angles, thus making possible the compression of more complicated shapes.

Avoidance of entrapped air serves to eliminate planes of weakness and to create a greater and more uniform density in the finished article. Elimination of air and gas reduces the oxidation of the metal powders, resulting in a more rapid and thorough diffusion of the powders during the sintering operation. The increased compactness of powders prior to compression permits the production of higher objects in a die of given depth. The following data appear in U. S. patent No. 2,198,612:

Flow Data: Grams Powder Flowing Through ⅛ in. Orifice Per Min.

Type of copper powder	36 per cent, 325 mesh	65 per cent, 325 mesh	95 per cent, 325 mesh
Atmospheric pressure: Corresponding to 760 mm. Hg in both hopper and mold	382	110	none
Partial vacuum: Corresponding to 4 mm. Hg in both hopper and mold	600	535	410

METAL CLEANING

Kolene Kleaner, using a new approach to metal cleaning, has met with considerable success in removing greases, oils, paints, mill and heat-treat scale, and silica scale, by oxidizing all of these materials on the surface of the metal, the oxidation converting them into readily removable compounds.

By W. F. SHERMAN
Detroit Editor, The Iron Age

THE most successful methods of metal cleaning have always been those which make use of the dissolving action of a reagent or the detergent, wetting, penetrating and dispersing properties of specially compounded cleaning media. There is little reason to believe that these methods, combined with the obvious mechanical scrubbing action, will ever be displaced in industrial plants.

However, an entirely new approach to the problem of metal degreasing and cleaning is indicated in claims made for a new patented material recently employed in several industrial plants and offered by Kolene Corp., Detroit, under the name Kolene Kleaner. This cleaner is a bath of catalyzed molten salts.

The action of this cleaner is that of oxidizing all of the various materials on the surface of the metal to be cleaned, the oxidation converting these materials into readily removable compounds. The first action is that of degreasing, which is accomplished by the oxidation of all carbonaceous matter, oils, greases, etc. This degreasing operation is not performed as a separate one, nor is the cleaner designed specifically as a degreaser, but the action on the carbonaceous matter is incidental to the cleaning operation which it accompanies.

The second action, simultaneous with the first, is the conversion of materials on the surface, including mill scale and heat-treat scale, which are relatively insoluble in many cleaners, into very readily soluble materials which can be removed in a mild acid bath. This action is accomplished through application of the well-known fact that the oxide of any metal containing the most oxygen is more soluble than oxides containing less oxygen. In most instances with this cleaner, this is exactly the reaction that takes place.

Taking, as an example, magnetic oxide of iron, which is the thick middle layer in mill scale (and highly resistant to attack even by sulphuric acid) the reaction is as follows when the cleaner is applied:

$$2\ Fe_3O_4 + O \rightarrow 3\ Fe_2O_3$$

The resultant compound is one more readily dissolvable and therefore more easily removed from the metal. A similar reaction is possible with the cupric oxide sometimes found on copper parts:

$$2\ Cu_2O + O_2 \rightarrow 2\ Cu_2O_2$$

The two foregoing examples are instances in which the lower oxides (virtually insoluble) are converted to oxides which are more soluble.

CLEANING CAST IRONS:

Another aspect in the use of this new cleaner is presented in the cleaning of cast iron surfaces which normally have on them so much silica that plating or coatings of any sort are extremely difficult to apply. In this case the reaction with the cleaning material is to

THIRTY-FIFTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

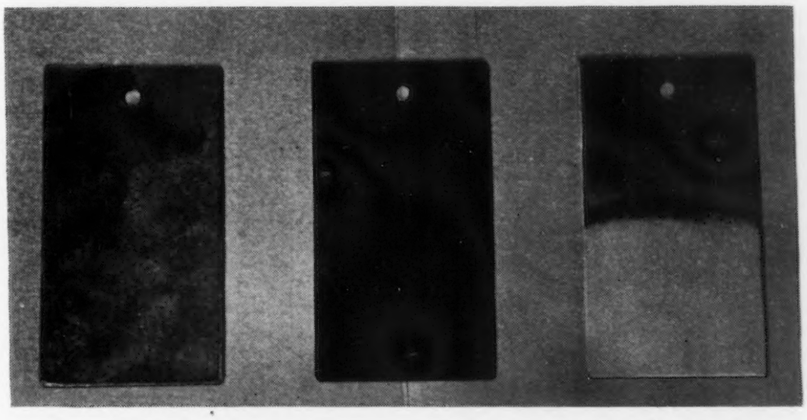
convert the silica to silicon dioxide, which is soluble in the cleaner. The present general practice of acid pickling exposes other materials such as phosphorous, sulphur, carbon and silicon because of the severe action of the acid on the metal itself. Where these are present, the Kolene Kleaner is said to oxidize the phosphorous, sulphur and carbon into vaporizable oxides.

In addition to the action on oils and greases, mill scale and silica, etc., the cleaner is said to have a similar action on welding flux and welding scale and makes it possible to remove them readily from the surface of metal parts. Buffing and polishing compounds, sometimes found difficult to remove, are treated the same way by this new method.

The Kolene mixture of salts is operative between 550 deg. and 600 deg. F., at which temperatures the salts form a clear green liquid. The carbonaceous materials oxidized by this liquid in the degreasing stage are all converted into vaporizable oxides which pass off as carbon dioxide without contaminating the bath. Hydrogen freed during some of the reaction passes off as a steam. It is stated that the other materials being cleaned from the metal are converted into extremely soluble oxides and are removed by short mild acid pickle. The degreasing action is complete as evidenced by the absence of water break on the cleaned metal.

Where it is necessary under present conditions to pickle for a considerable time in acid to remove impurities which are relatively insoluble, the base metal is also attacked, exposing insoluble materials from the metal itself which show up on the surface as black smudge, commonly known as pickling smudge. The new cleaning method makes long pickling unnecessary, so it does not produce pickling smudge. When necessary it will even remove smudge from overpickled pieces.

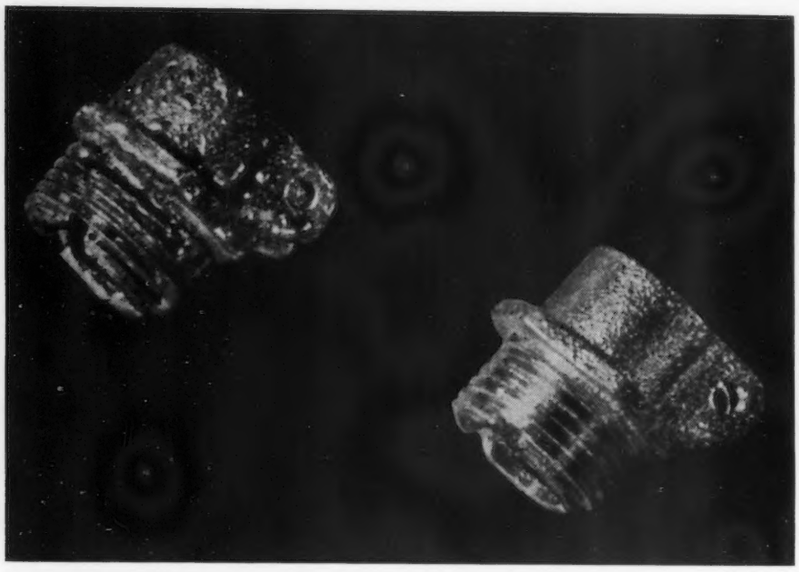
A SMALL installation showing two Kolene Kleaner pots heated by gas flames and insulated against heat loss. An unfinished metal pot, not insulated yet, can be seen in the right foreground of the picture.



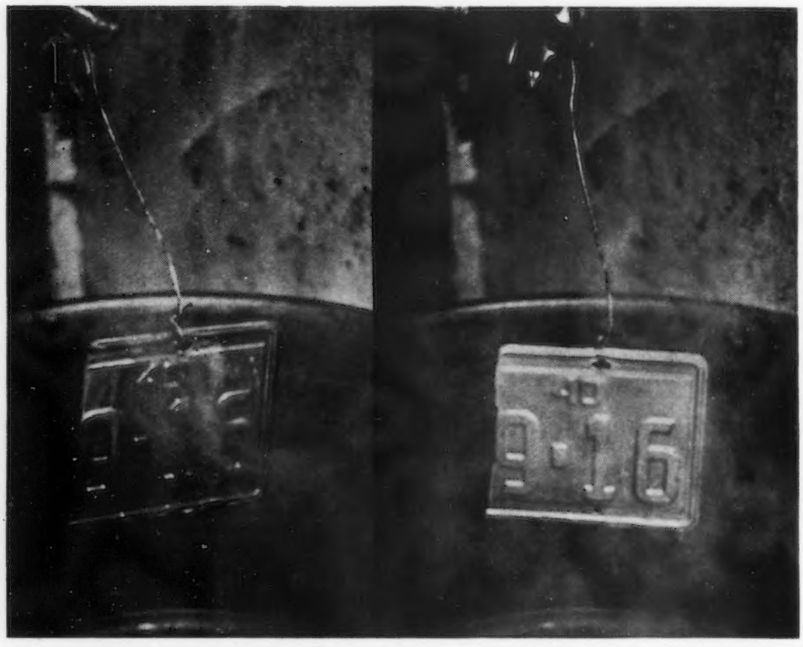
AT the left is the raw test piece covered with mill scale. In the center is a piece after immersion in Kolene Kleaner with the mill scale converted to a high oxide soluble material. In itself this is reported to be a satisfactory paint base for some purposes. At the right, the lower half of the specimen was immersed in Kolene Kleaner so the mill scale was made soluble, and the entire specimen dipped in 8 to 10 per cent hydrochloric acid for 15 sec. It can be seen that the acid did not affect the upper half of the sample, but thoroughly cleaned the lower half by dissolving the material on it.

No Hydrogen Embrittlement

Another feature is the absence of hydrogen embrittlement on springs and similar parts which acid pickling sometimes produces, due to the release of hydrogen during the pickling action. The absence of hydrogen embrittlement after use of this cleaner is attributed to the short time required in the acid vat. Lock washers are among the parts which are being cleaned with this method and tests of 100 hr. in salt spray and on compression testing machines have been accomplished without failure of the metal. Because the cleaner so readily provides for the quick removal of all types of buffing compounds, the less soluble com-



CAST iron samples, coated with a low-tin-lead alloy. The one at left was pickled in acid in the accepted manner, while the one at right was subjected to the recommended procedure for Kolene Kleaner.



PAINT removal is shown in these illustrations which depict (at left) a piece of painted license plate ready for immersion in acid after the Kolene Kleaner has oxidized the finish. On the right, the cleaned piece of metal is shown after 15 sec. in the 8 to 10 per cent hydrochloric acid.

pounds (sometimes lower in cost) can be used when desired.

Besides the evidence of complete cleaning given by the absence of water break, a practical proof is offered in the readiness with which metal so cleaned can be coated with very low tin alloys, compositions with as high as 90 per cent lead having been used with remarkable success. This cleaning provides a means of improving other finishes such as galvanizing, cadmium, paint, etc.

Pots made of carbon steel or boiler plate in any desired shape are used for the operation. Heating by any conventional means can be employed and in most cases the pots are sheathed and insulated against loss of heat. Vents are usually provided above the pots to carry off excessive fumes from the impurities, such as oil and grease, but the fumes are said to be non-toxic and non-corrosive.

The compounds formed by the cleaner (without any subsequent acid pickling bath) may be employed as a paint base. Such compounds, being of the highest possible oxygen content, cannot oxidize further and therefore, are themselves fairly resistant coatings. At the same time, the oxidizing effects of the bath make it a suitable paint remover, as shown in one of the photographs.

Some typical applications, illustrative of effectivenes and time saving, are shown herewith:

Welded Pipe—Mill scale on welded pipe and the line of welding flux around the seams has been a problem in the pipe industry. Cleaning has frequently been accomplished with an alkaline wash for 5 min., followed by a rinse, 2-hr. pickle in inhibited sulphuric-hydrofluoric acid (10 per cent at 180 deg. F.), then a second rinse, an alkaline neutralizer bath and a third rinse; total time 125 min. The Kolene procedure calls for only 10-min. immersion, rinse, 15 min. in the cleaner, then rinse, and ½ min. in acid again; total time 30½ min. In addition, the Kolene procedure cuts out a degreasing operation which becomes unnecessary.

Iron Castings — The original process calls for sand blast, followed by pickling for 18 to 24 hr. in sulphuric-hydrofluoric acid. The Kolene process has been set up for 5-min. immersion in the Kolene Kleaner, treatment with the same acid as above for 15 min., reimmersion in Kolene for 20 min. and a 15-sec. (approximately) dip in hydrochloric acid.

The material described in this article is a new cleaner not similar to the Kolene chlorinated solvent previously on the market and still used for some applications.

Black Heat Temperatures

—Preheating for welding of steel, cast iron, and nonferrous metals; local heat treatment and hardening—all these operations and many others should have careful temperature control. Herein are data on metal analyses, temperatures necessary, and a novel method of gaging such temperatures.

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By T. E. LLOYD
The Iron Age, New York

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DEGREE of heat or temperature may be classified in several ways—perhaps the simplest method is with respect to whether or not the temperature is accompanied by color visible to the naked eye. In a perfectly dark room it is barely possible to distinguish a faint dark red color at about 900 deg. F., whereas this "lowest temperature" which it is just possible to observe becomes higher as more outside light enters the room or shop. For general purposes, however, that is for the average shop, it may be considered that temperatures below 1100 deg. F. will not show color, while temperatures above this point will be accompanied by increasing degrees of color. Thus, the temperature scale may arbitrarily be divided into the following:

Black heat range—below about 1100 deg. F.

Red heat range—above about 1100 deg. F.

The worker in the metal field is increasingly being given instructions by the producers of various materials and their technical divisions, and by his engineers and by his supervisors, in which he is called upon to control temperature within fairly close limits. The ever greater demand is for control in the *black heat range*, as for instance when it is necessary to preheat for welding. In a great many cases it is impractical to use a thermocouple and pyrometer, since the former should be peened into the work and this requires time as well as the use of special equipment. When it is necessary to determine whether a certain maximum temperature has been exceeded or whether a certain minimum has been reached, one of the best methods of making such determinations is with a proprietary material known as Tempil or Tempilstik. The Tempil method consists of the use of thermometric pellets which melt at stated and convenient temperatures, thus 200 deg. F., 250 deg. F., 300 deg. F., etc., up to 1600 deg. F. They are available in 25 deg. F. steps in the range of 100 deg. F. to 325 deg. F., and in 50 deg. F. steps from 350 deg. F. up to 1600 deg. F. In use it is only necessary to place the pellets upon or against the heated object.

In a great many cases the heating is done locally with a torch or burner, where it is required to heat but a particular part of the entire piece. This is the case when hot-bending aluminum tubing. Because aluminum is extremely weak at the upper end of the black heat range, the worker must be careful not to overheat.

A number of uses suggest themselves for the simple Tempil method of temperature control. This discussion is concerned primarily with the following operations for various metals, in which temperature control in the black heat range is necessary:

Steels

Preheating for Welding:
- General discussion.
- Preheating plain carbon steel:
  - Carbon molybdenum steels.
  - Other low alloy steels.
  - 2 per cent Cr-Mo and 5 per cent Cr-Mo steels.
  - 12 per cent Cr to 30 per cent Cr steels
  - High chromium nickel austenitic steels.
  - Joining dissimilar compositions.

Surface Welding:
- General discussion.
- Hard facing.
- Overlaying for corrosion resistance.

Torch and Flame Cutting:

Conditioning of Semi-Finished Steel:

Heat Treatment:
- Local stress relieving.
- Determination when to remove work from furnace, etc.

Straightening Armor Plate:

Local Heating and Cooling:
- Bending.
- Shearing of bar steel.
- Straightening hardened parts.
- Shrinking one part upon another.
- Reconditioning refinery still tubes.
- Repair welding of costly dies.

Cast Iron

Preheating for Welding:
- Plain cast iron.
- Alloy cast iron.
- Ni-Resist.

Tarring Cast Iron Molds:
Tarring Cast Iron Pipe:

Non-Ferrous Metals

Preheating for Welding:
- Aluminum
- Monel
- Nickel
- Inconel
- Copper
- Zinc
- Magnesium

Brazing and Soldering:
Heating for Fabrication:
- Aluminum alloys.
- Magnesium

Steels

Preheating for Welding: The tremendous stimulus which was given to metal fabrication by the development of welding is of so recent an origin that it is well known to all workers in the field. Because welded joints are consistently stronger than those formed by the older methods of joining, it was natural that welded parts would be used under conditions of higher stress. This, however, has made it necessary to insure that welds be free of objectionable defects such as porosity, slag inclusions and cracks, since it is obvious that if welded joints are to perform satisfactorily in service, they must be sound, and generally equal at least, in properties to the base metal.

By far the most insidious defect in a welded joint is a crack. This holds true whether cracks are large or small, since under many conditions of service, small cracks will grow with eventual sudden failure of the section.

One factor which is common to many steels is their tendency to air-harden when cooled rapidly from high temperatures. The degree to which the various steels will air-harden is related primarily to the particular composition involved and the rate of cooling in the various locations in the welded joint. It is generally true, but not without some exception, that the greater the air-hardening of a steel during welding the less is the ductility and shock resistance as measured by bend, hardness, and impact tests upon the welded joint. Obviously, the greater the air-hardening tendency of a given steel, the greater is the danger of cracking during and after welding.

The control of the air-hardening tendencies of steel in welding is usually sought in two ways. In some cases it is possible to alter the composition of a steel so that a minimum of air-hardening will take place. The most common method, however, is to control the rate of cooling during the welding, as in the great majority of cases the engineer has little choice with regard to composition, since a particular material selected usually represents the best compromise between economy and the suitability of the material for a particular service. Quite often when it is attempted to change composition, the service characteristics of a material are also affected to an undesirable degree.

It is natural, therefore, for the welding engineer to attempt to eliminate the possibility of the formation of cracks in welding by controlling the rate of cooling in the welding operation. This is successfully carried out today by the operation known as preheating in which the parts to be welded are heated before welding to some predetermined range of temperature, as a result of which the rate of cooling in the welded joint will be considerably retarded. From the metallurgist's viewpoint the slowing down of the cooling allows certain microscopic changes to take place which yield softer and more ductile structures.

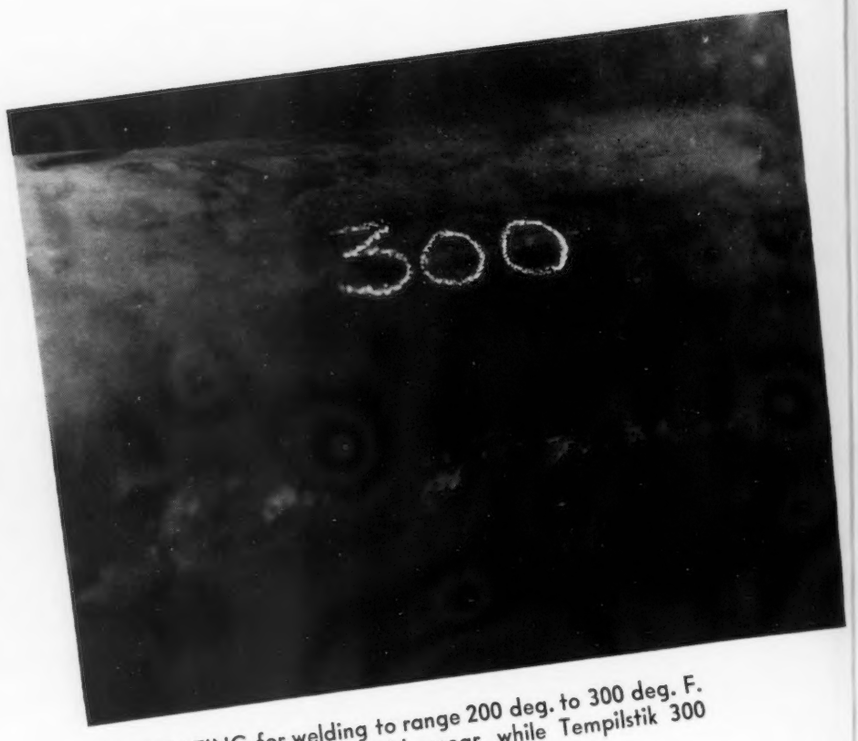
There are a number of factors which affect the air-hardening characteristics of steels. As previously stated, composition and rate of cooling are prime factors. Others will be considered in a later paragraph.

Preheating is a prime necessity in welding a great many steels. Dr. Theisinger, well known welding authority, expreses the importance of preheating in an excellent summation, thus:

> **"In the actual welding procedure, there is one additional precaution that is not only helpful, but practically essential: Some heat should be introduced into the formed shell prior to welding and maintained until the completion of the joint, especially in unheated shops in the winter months. . . . Preheating is not recommended as a cure-all, but whenever some trouble is encountered in welding, the source of which may be difficult to find, the first attempt at correcting the difficulty should be the introduction of some heat into the vessel."**

Henry and Claussen point out:

> **"It is important that the part is preheated to the correct temperature . . . there are occasions when too high preheating temperature may be as disastrous as too low; for example, a complicated part without internal strutting may collapse, or the heat from the part may prejudice the operator's ability to produce a sound weld."**



PREHEATING for welding to range 200 deg. to 300 deg. F. Tempilstik 200 leaves liquid smear, while Tempilstik 300 remains a chalk-like mark.

PREHEATING for welding to range 300 deg. to 400 deg. F. Tempil on right has melted; 400 deg. F. Tempil on left has not, since that temperature was not reached.

There is a need for a "Recommended Practice" for preheating temperatures for welding various steels. At present this information is available in scattered technical articles and in the files of private laboratories of large organizations. In the following paragraphs an attempt is made to review a part of the literature.

Preheating before welding should be practiced for the following reasons:

(a) Eliminates or lessens the danger of formation of cracks.
(b) Minimizes hard zones.
(c) Minimizes shrinkage stresses.
(d) Lessens distortion.

Preheating need is increased with any steel as the following factors are changed:

(1) The larger the mass being welded.
(2) The lower the temperature of the piece being welded.
(3) The lower the atmospheric temperature.
(4) The smaller the weld rod diameter.
(5) The greater the speed of welding.
(6) The more complicated the shape and design of the parts being joined.
(7) The greater the difference between the mass of the parts being joined.
(8) The higher the carbon content of the steel.
(9) The higher the manganese content of the steel.
(10) The more the alloy content of the steel.
(11) The more the alloy content in air-hardening steels.
(12) The greater the air-hardening capacity of the steel.

Preheating Plain Carbon Steels: In general it may be stated that the plain carbon steels with carbon contents below 0.20 per cent do not require preheat unless the sections being welded are large. In such a case a preheating temperature of 200 deg. F. minimum is recommended. As the carbon content is raised, the need for preheat is imperative and judgment should be used based on the factors listed above. When carbon content is above 0.35 per cent, the steel is considered by some to be dangerous to weld but with proper preheating temperature, sufficiently high, and immediate stress relief, no cracks should result.

Carbon Content of Steel, Per Cent	Recommended Preheating Temperature
Below 0.20	Up to 200 deg. F. minimum
0.20 to 0.30	200 deg. to 400 deg. F.
0.30 to 0.45	Over 300 deg. F., preferably 500 deg. F.
0.45 to 0.80	At least 500 deg. F. is essential, somewhat higher preferred

Preheating Carbon-Molybdenum Steels: This steel is commonly used where somewhat higher strength is required at elevated temperatures than can be obtained with plain carbon steel. Thus, this composition is largely used for high temperature steam piping, the majority of which contains 0.10 to 0.20 per cent carbon. Occasionally, forgings and castings are used with carbon contents up to 0.35 per cent.

Carbon-molybdenum steel should always be preheated, but the preheating temperature should be considerably increased with higher carbon contents.

Carbon Content of Steel, Per Cent	Recommended Preheating Temperature
0.10 to 0.20	300 deg. F. to 400 deg. F. minimum
0.20 to 0.30	400 deg. F. to 500 deg. F. minimum
0.30 to 0.35	500 deg. F. to 600 deg. F. minimum

Preheating Other Low Alloy Steels: In this group falls a great many compositions which contain varying amounts of the elements chromium, nickel, molybdenum, vanadium, tungsten, manganese and silicon. Obviously, it is not possible to give all the individual compositions here. All these steels should be preheated before welding for safest procedure. The higher the carbon content, the greater is the danger of crack formation and hence the need for high preheating temperatures. The factors previously listed in discussing the need for preheating should be reviewed before welding these steels.

An excellent resumé of the welding of nickel containing alloy steels will be found in the International Nickel Co. bulletin, "The Working of S. A. E. Nickel Alloy Steels." The following table is taken therefrom:

S.A.E. Number	Carbon, Per Cent	Preheat Temperature
2015, 2115, 2315, 3115, 4615	0.25 max.	Up to 300 deg. F. minimum
2330-35	0.20 to 0.50	300 deg. to 600 deg. F. minimum
2340-45	0.25 to 0.50	300 deg. to 600 deg. F. minimum
3215, 3125	0.30 max.	200 deg. to 400 deg. F. minimum
3130-3140 X3140, 3230	0.25 to 0.45 max.	600 deg. to 800 deg. F. minimum
3145-50 3245-50 3325-40 3240, 3435 3450	0.20 to 0.55 max.	900 deg. to 1100 deg. F. minimum
4620 4815, 4820	0.25 max.	400 deg. to 800 deg. F. minimum
4340-45, X4340, 4640	0.35-0.50	400 deg. to 900 deg. F. minimum

The Metal & Thermit Co. recommends the following preheating

temperatures for the following low alloy steels:

Steel	Preheat Temperature
Cromansil	300 deg. to 500 deg. F. minimum
Man-Ten and Sil-Ten	300 deg. to 500 deg. F. minimum
Chrome vanadium	300 deg. to 500 deg. F. minimum
Manganese vanadium	300 deg. to 500 deg. F. minimum
Copper bearing	200 deg. to 300 deg. F. for higher carbon grades
Copper molybdenum	

Preheating 2 Per Cent Chrome-Molybdenum and 5 Per Cent Chrome-Molybdenum Steels: These steels are commonly used in the petroleum refinery because of their superior corrosion resistance to plain carbon steels. In wrought material the carbon content will seldom exceed 0.15 per cent, but in castings this element may run as high as 0.25 per cent. Recommended preheating temperatures are given below:

Analysis, Per Cent	Preheating Temperature
2.00 Cr, 0.5 Mo, up to 0.15 C	400 deg. F. minimum
2.00 Cr, 1 Mo, up to 0.15 C. .	500 deg. F. minimum
2.00 Cr, 0.5 Mo, 0.15 to 0.25 C.	500 deg. F. minimum
2.00 Cr, 1 Mo, 0.15 to 0.25 C	600 deg. F. minimum
5.00 Cr, 0.5 Mo, up to 0.15 C	600 deg. F. minimum
5.00 Cr, 0.5 Mo, 0.15 to 0.25 C	700 deg. F. minimum

Preheating Plain High Chromium Steels: These compositions are used primarily in environments where the high chromium contents give excellent corrosion resistance to certain media.

Analysis, Per Cent	Preheating Temperature
12 to 14 chromium steel	300 deg. to 500 deg. F. minimum
16 to 18 chromium steel	300 deg. to 500 deg. F. minimum
23 to 30 chromium steel	At least 400 deg. F. min.

Preheating High Chromium Nickel Austenitic Steels: As a general rule these steels do not require preheat.

Preheating When Joining Steels of Different Analyses: It is often necessary to weld two steels of different analyses. In such a case the preheating temperature should be determined by that of the composition which requires the greatest preheat. A few typical examples are given below:

When Joining	Preheat Temperature
S.A.E. 1040 to S.A.E. 1020	600 deg. F. minimum
18-8 to carbon-moly steel	300 deg. F. minimum

Surface Welding: An excellent discussion upon this subject appears in the American Society for Metals, *Metals Handbook.* While this discussion refers primarily to the deposition of hard metal which is resistant to abrasion, it is also to be pointed out that surfacing may be employed to deposit metal for corrosion resistance. The following quotation from the above articles refers to preheating:

"The same general rules apply to preheating before hard facing as apply to most welding operations. Parts are always preheated in cases where the application of the hard facing alloy would otherwise cause them to warp or check, or where time and cost can be saved by preheating. Steels having 0.40 per cent carbon should usually be preheated. The optimum temperature of preheating is dependent upon the size and composition of the part, but usually it is between 700 deg. to 1200 deg. F. For certain classes of electric arc welding a preheat of from 350 deg. to 450 deg. F. is desirable."

Torch and Flame Cutting Steel

Both the Metals Handbook and the Welding Handbook contain detailed chapters upon this subject. Preheating is employed for two reasons. First, it requires considerably less of the cutting gases when the steel has been preheated. Secondly, on higher carbon and alloy steels preheating is used to prevent cracks on the cut edges. As a general rule steels containing less than 0.30 per cent carbon can be cut without difficulty if no preheat is used. However, if sections are massive and work is done in cold weather it is advisable to preheat to above 200 deg. F. for safety, regardless of composition. Higher carbon steels or alloy steels should always be preheated before cutting to the temperature range from 500 deg. to 1000 deg. F., depending upon mass and composition. When removing risers from castings of high carbon or alloy steels, the same preheating temperatures as recommended above should be used; 4 to 6 per cent chrome-moly steel castings should be preheated to about 900 deg. F. before removing risers. High manganese steels should also be preheated for best results. The following excerpts from the Welding Handbook article are instructive:

"The need for preheating is greater for the heavier sections than for the lighter sections and becomes a requirement when high carbon or alloy steel heavy sections are to be cut to intricate shapes. With such shapes having acute angles where high stress concentration will be involved, it is particularly desirable to preheat."

"Preheating accomplishes several useful purposes:

"First: Preheating increases the efficiency of the flame cutting operation by reducing the amount of oxygen required to make the cut.

"Second: It reduces the temperature gradient set up by the cutting operation. This in turn reduces or gives more favorable distribution to the cooling stresses and, thereby, prevents the formation of quenching or cooling cracks.

"Third: By reducing the rate of cooling the cut surface does not become as hard.

"Fourth: The temperature difference between the cut face and the body of the metal being less, there is less carbon and nickel migration towards the surface."

In practice the temperature used for preheating varies from a few hundred degrees to about 1300 deg. F. The preheating temperature most employed ranges from about 600 deg. F. to about 1100 deg. F.

Heat Treatment of Steel

It is often necessary to carry out local heat treatments on steel. In many cases this is dictated by reasons of economy.

In a great many specifications it is required that careful heat treatment be followed with respect to the temperature of the steel when it is either inserted into or removed from the heat treating furnace. Thus, in alloy steels it is often necessary to normalize and then draw, but specifications state that the steel must be cooled to below some such temperature as 500 deg. F. before being replaced in the heat treating furnace. It is also often required to furnace cool to some pre-determined temperature before removing the charge from the furnace. For accurate work Tempils are very useful, since when the furnace cools it will do so at a rate greater than the charge, particularly if the pieces are massive. Thus, a furnace thermocouple may read lower than the pieces being cooled and harmful results might be had if the charge were removed too soon.

Local Heating and Bending

The bending or forming of steel tubes is in a number of cases sufficiently mild so that it is not necessary to heat to the red-heat range. Since air hardening of alloy steels takes place above temperatures in the vicinity of 1400 deg. F. it is important not to exceed this temperature if subsequent heat treatment

is to be avoided. In this day of need for highly increased production for defense purposes, it is suggested that manufacturers review their fabrication processes to determine the possibility of carrying out some of the operations at lower temperatures, which now require higher temperatures with longer time involved and at greater cost.

Shearing of Bar Steel: D. M. Henderson, Jr., in the IRON AGE, July 18, 1940, discusses the rough and broken condition of sheared ends and bars and his investigation culminated in a remedy. His conclusions state that certain temperatures are to be avoided relating to the carbon content. The following table is taken from Mr. Henderson's article as listing temperatures at which pronounced breakage is likely to occur when bars are sheared at or near these temperatures:

0.12 per cent carbon	530 deg. F.
0.38 per cent carbon	570 deg. F.
Up to about 0.85 per cent carbon	600 deg. to 620 deg. F.
0.85 per cent carbon	530 deg. F.
Above 0.85 per cent carbon	600 deg. to 620 deg. F.

Straightening Hardened Steel Parts: It is often required to produce a high degree of flatness in hardened steel parts after quenching and drawing heat treatment. Since hard steels possess relatively little ductility at room temperature and since this ductility usually increases considerably at temperatures somewhat above atmospheric, the practice of straightening hardened steel parts is attempted where necessary at some slightly elevated temperature. Here the worker finds himself in a quandary. He would like to heat to as high a temperature as possible to minimize the danger of crack-formation. On the other hand, if the straightening temperature is too high, the hardness of the part will be lowered with probably early failure in service.

In general, it may be said that any hardened steel part may be reheated for straightening to any temperature below that at which the part was drawn or tempered. Thus, carbon steel reamers or broaches may be heated to 300 deg. F., at which heat there is little danger of cracking, whereas if the straightening is done at room temperature considerable possibility of cracking exists. Armor plates, particularly the non-homogeneous type, are liable to contain a considerable "bow" after heat treatment. These steels have a high degree of elasticity, but it will be found that reheating to some temperature below the drawing temperature will lessen the danger of crack formation in straightening without appreciably affecting the hardness.

Shrinking one Steel Part upon Another: Better control of the fit and a minimum of residual stresses will result if temperature is controlled during this work. By the use of Tempils, for instance, it is possible to heat either locally or outside of a furnace with resultant economy and good temperature control.

Repair Welding of Costly Steel Dies: The life of costly steel dies may be extended many times by proper repair of small cracks or checks or other defects when they are first observed. The practice consists of depositing metal from a self-hardening analysis welding rod. Because the die steels are usually extremely hard, it is advisable to preheat carefully before welding. Temperature control of preheat is very useful so that the hardness will be maintained in the finished repair without the presence of weakening cracks.

Reconditioning Refinery Still Tubes: It is well known that the ends of cracking still tubes may fail before the body of the tube. Since these tubes are quite long and represent a high investment per piece, it is attempted wherever possible to repair such tubes. When the composition is any one of the various steels which require preheat, it is very useful to control preheating temperature previous to the welding on of a section of a similar or superior material as replacement for the removed part which failed.

Cast Iron

Preheating for Welding: Cast iron should never be welded without preheat. A temperature of 700 deg. to 800 deg. F. is recommended for ordinary cast iron, whereas the International Nickel Co. advises a preheat of 500 deg. to 1000 deg. F. for Ni-Resist, with the added precaution that the parts should not be allowed to drop below the preheating temperature during welding. The highest pre-heat temperatures give greatest assurance of crack-free welds.

Non-Ferrous Metals

Aluminum Welding: Aluminum should be preheated before welding. Even for sheet 0.06 in. thick, it may be necessary to raise the temperature to 700 deg. F. in a zone 2 in. wide on either side of the scarves. Cast aluminum should be heated slowly to avoid cracking in the section of the casting nearest the flame. If preheat temperatures go much above 800 deg. F., there is danger of burning the metal.

Monel, Nickel and Inconel Welding: For best results it is desirable to heat heavier sections to 200 deg. to 300 deg. F. before welding.

Copper Welding: Because of the high thermal conductivity of copper and copper alloys, welding is facilitated by preheat. The degree of preheat varies with the particular set of conditions. It is also recommended that if the full strength of the annealed metal is desired it is necessary to hot forge the weld or cold peen and anneal. The hot hammering may be done during cooling immediately after the welding, but no forging should be carried out below about 600 deg. F.

Zinc Welding: After the welding of zinc and its alloys it is recommended that light hammering of the deposited metal be carried out at 200 deg. to 300 deg. F. to refine the grain and improve the strength and ductility.

Magnesium Welding: It is recommended that a preheating temperature of 500 deg. to 600 deg. F. be used in the welding of magnesium alloys.

Fabrication Procedures for Non-Ferrous Alloys: Aluminum alloys are plastic at elevated temperatures up to somewhat below their melting points. These alloys become brittle or "hot short" at the upper end of the black heat range so that the worker has to resort to temperature measurement to prevent overheating. Care should be taken to consider the grade and temper of the particular aluminum alloy being worked. The bending quality of aluminum in the range 300 deg. to 400 deg. F. is considerably better than at room temperature. Even at temperatures above 600 deg. F. the alloys are quite plastic but an annealed material results after cooling to ordinary temperature.

In the copper-zinc alloys, particularly the high brass and Muntz metal types of alloy, a brittle range of temperature exists between 500

deg. and 750 deg. F., according to the Copper Alloy Bulletin of the Bridgeport Brass Co. It is indicated therefore that this temperature range should be avoided.

Magnesium and its alloys are being increasingly used because of the strength obtainable with light weight. These alloys, like aluminum, melt at the upper end of the black heat range. It is recommended that hot working take place about the middle of the black heat range. Thus, forming in steel dies should be done in the temperature range 300 deg. to 600 deg. F. Spinning is best carried out in the range 400 deg. to 600 deg. F.

In the fabrication of these and other non-ferrous metals, a simple temperature control method is exceedingly useful in eliminating rejects as well as in producing material with desirable properties for service.

Other Operations in Which Temperature Control Is Very Valuable: Surface welding; hard facing; torch and flame cutting; conditioning of semi-finished steel by flame; heat treatment; bending; shearing of bar steel; straightening hardened parts; shrinking one part upon another; reconditioning refinery still tubes; repair welding of costly dies; tarring cast iron molds; tarring cast iron pipe; fabricating aluminum and aluminum alloys; fabricating magnesium and magnesium alloys; fabricating copper and copper alloys; brazing; soldering; joining metals of dissimilar metals.

Conclusion

A recent writer has stated:

"Every application of heat, no matter how slight, will leave its mark for better or for worse; therefore, the importance of proper heat control to the uniformity of metals."

The number of processes in which it is necessary to work in the black heat range is continually increasing. New information is being developed with respect to more and more metals. The demands upon materials is becoming more severe. Automatically, therefore, the need for heat control is imperative.

Bibliography

"Welding Metallurgy" (American Welding Society), Henry and Claussen, Vol. II, Part VIII, "Preheating and Stress Relief," pp. 327-356.

A.S.M. Handbook, pp. 229-240.

Welding Handbook.

Welding Encyclopoedia.

Metal Progress, p. 34, July, 1940, "Critical Points."

"Oxy-Acetylene Welding of Carbon Molybdenum Pipe," E. R. Seabloom, Welding Engineer, July, 1940.

"Welding Ni-Resist," Nickel Cast Iron News, January, 1940.

"Weld Hardening of Carbon and of Alloy Steels," French and Armstrong, Welding Journal, October, 1939.

"Welding Alloy to Carbon Steel," Nickel Steel Topics, August, 1940.

"When and How to Preheat," C. C. Notebaert, Welding Journal, September, 1939.

"Oxy-Acetylene Welding of Carbon-Molybdenum Steel Piping for High-Pressure, High-Temperature Service," Rooke and Saacke, Welding Journal, August, 1940.

"Advantages of Low-Alloy Steel for Pressure Vessels," Robert Lattice, Welding Engineer, August, 1940.

"The Metallurgical Effect of Oxygen Cutting on Steel," J. R. Cady, Welding Research Supplement, September, 1940.

"Arc Welding of Cast Iron with Non-Ferrous Electrodes," Welding Engineer, April, 1940.

"Welding of Cast Iron," R. J. Franklin, Welding Engineer, February, 1940.

"Shearing of Bar Steel," D. M. Henderson, Jr., THE IRON AGE, July 18, 1940.

"Tips on Torch Spotting to Straighten Hardened Parts," Heat Treating Hints, Vol. 3, No. 6.

"Notes on the Conditioning of Semi-Finished Steel," Metal Progress.

"Welding Cast Iron," Metals and Alloys, November, 1940.

"Welding, Brazing and Soft Soldering of Monel, Nickel and Inconel," Bulletin T-2, International Nickel Co.

"Stress Relief of Welded Pressure Vessels," Harold Lawrence, Welding Engineer, April, 1940.

"Simple Precautions Will Prevent Hot Breaks in Brass Fabrication," Copper Alloy Bulletin, Metal Progress, January, 1941.

"Welding Zinc and Its Alloys," Spraragen and Claussen, Welding Journal, June, 1940.

"Reconditioning Still Tubes," Refiner, August, 1940.

"Repair Welding of Dies," A. R. Butler, Steel, Oct. 14, 21, 28, 1940.

"Aluminum Brazed Joints," Welding Engineer, February, 1940.

"Low Temperature Brazing with Silver Alloys," R. H. Leach, Welding Journal, June, 1940.

"Aluminum Soldering," Spraragen and Claussen, Welding Research Supplement, September, 1940.

"Recommended Preheat and Heat Treatment Chart," Metal & Thermit Corp.

"Trends in Pressure Vessel Fabrication," O. T. Barnett, Welding Briefs, October, 1940.

"Welding 70,000 Tensile Steel," Dr. W. G. Theisinger, THE IRON AGE, Jan. 16, 1941.

"The Refiner's Alloy," W. L. Archer, Refiner and Natural Gasoline Manufacturer, January, 1941.

"Welding Chromium and Chromium-Nickel Corrosion and Heat Resisting Steel," Spraragen and Claussen, Welding Journal, March, 1939.

"Welded Joints in Carbon-Molybdenum Piping," Welding Journal, January, 1939, R. W. Clark.

"Welding Molybdenum Steel," Spraragen and Claussen, Welding Journal, November, 1938.

"Welding High Pressure Piping, Essex Generating Station," H. Weisberg, Welding Journal, November, 1938.

"Welding of Medium Carbon Steel," R. W. Emerson, Welding Journal, October, 1938.

"Fabrication of Monel, Nickel and Inconel Seamless Pipe and Tubing," Bulletin T-17, International Nickel Co.

"Metallurgical Investigation of Flame-Cutting," Review in "Metals and Alloys."

"Oxygen Cutting of Steel," Spraragen and Claussen, Welding Research Supplement.

"How to Cut Chromium Steel Castings," R. B. Aitchison, Welding Journal, May, 1940.

"The Working of S. A. E. Nickel Alloy Steels," American Machinist, Oct. 18, 1939.

"Welding Aluminum and Its Alloys," Welding Journal, January, 1941.

"Flame Gouging Welds," Harold Lawrence, Steel, Dec. 16, 1940.

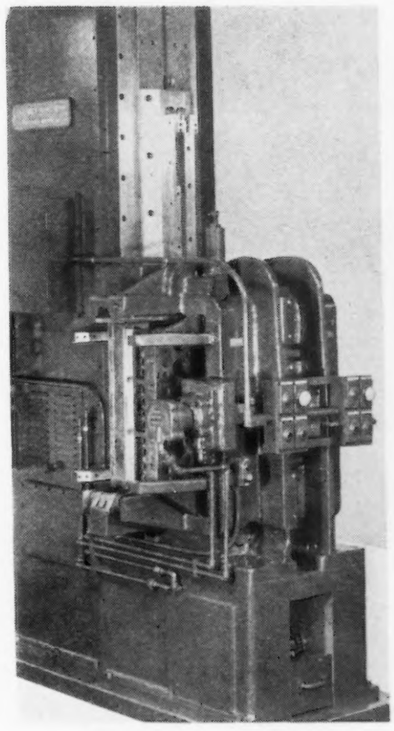
"Weldability, Cracks and Brittleness Under External Load," Spraragen and Claussen, Welding Research Committee, American Welding Society, January, 1941.

Broaching Operations On the New Ford 6

IN manufacturing the new Ford 6-cylinder engine for cars and trucks, broaching equipment is performing several unusual operations. To assure maximum accuracy and uniformity of alinement of crankshaft bearings, the main bearing cap flats of the cylinder blocks are broached in a single pass, at the rate of 90 blocks per hr. A Colonial Broach single ram type of machine with semi-automatic control and a specially designed holding fixture is used. Machine is of 10-ton capacity and 60 in. stroke, and is hydraulically operated. The handling fixture loads, positions and ejects the cylinder blocks automatically, after the operator slides the blocks on to the handling rails at the left side of the machine as shown in Fig. 1.

When the machine is started, shuttle fingers pull the cylinder block into broaching position, where a locating pin engages a hole on the centerline of the crankshaft bore. After the block is located, it is automatically carried and locked against the face of the machine by hydraulically operated clamps, after which the ram starts downward and all three pairs of faces are broached successively.

After the cut is completed, the block is automatically pushed free of the locating pin and away from the broach, allowing the ram and broach to return to starting position without interference. The loading shuttle mechanism also then returns to loading position and the finished part remains in position until the next block is placed upon the handling rails. When the cycle is completed, the finished part is ejected to the right side of the machine by a second set of fingers similar to those employed in the loading operation.



The second unusual operation utilizes a Colonial utility press of 4-ton capacity and 24-in. stroke, equipped with an eight position indexing table. In this installation the plunger holds both a bushing seating tool and a burnishing tool, guided by bars to assure correct alinement. The part itself is unusual in that it combines the body of an oil pump with one of the main bearing caps.

After placing the pump bodies on the indexing table, bushings which are fed from a hopper on the left side of the machine are pressed into position by the seating tool in the first stage of the operation. The indexing table then moves to the next station where a broach burnishes the bore of the bushing to finish size. The entire cycle is continuous and automatic. It is only necessary for the operator to place the parts in position over the locating pins on the table and to remove them from the indexing table in the loading and unloading position. Parts are assembled and burnished at a rate of 600 per hour.

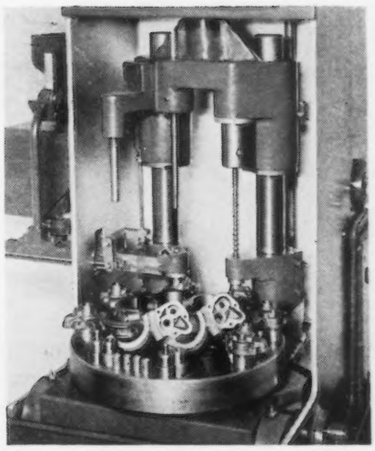


FIG. 2—Colonial 4-ton utility press equipped with hopper feed, indexing table and seating and burnishing tools for operations on Ford 6 oil pump body.

LEFT

FIG. 1—Special fixture with semi-automatic control mounted on Colonial single ram broaching machine for broaching main bearing flats on new Ford 6-cylinder engine.

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Electrolytic Etching of Metals

PROF. A. L. DE SY and H. Haemers, of the metallurgical and metallography laboratory at Ghent University, in a paper in *Stahl und Eisen*, give details of a modified procedure for the electrolytic etch-polishing of metal sections.

In his method, P. Jacquet affects electrolysis in a concentrated solution of glacial acetic acid and perchloric acid; this method has the advantage over mechanical polishing of avoiding a cold worked surface layer and polishing scratches, while at the same time the delineation of inclusions is more carefully preserved. The authors have investigated means for accelerating the Jacquet test and recommend a modified procedure of etch-polishing in a solution of perchloric acid and with ethyl alcohol denatured with ether in which the metal sample, after polishing with No. 2 to 0 emery cloth, is inserted as anode in a circuit of at least 110 volts. A polished section of steel can be obtained by this method in under 2 min., while aluminum and its alloys require only 3 min. The current density used depends on the nature of the metal treated.

A final etch is recommended after electrolysis in the case of high-alloy steels, particularly for stainless steels. The text contains 16 very fine reproductions of metal surfaces prepared by this method, the finer details being shown in sharp definition.

Cibanite Mountings for

THE technique of preparing and using Cibanite, a condensation product of aniline, hydrochloride and formaldehyde, for metallurgical mountings is explained herein. Cibanite mountings have been found extremely suitable for all types of metallurgical mountings, including fine wires, strips, and ordinary specimens.

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IN all specimen preparation, it should be realized that the reason for polishing the specimen should govern the various steps and polishing methods used and should be kept firmly in mind until the finished sample is placed in the microscope ready for inspection. For example, it is very poor practice to mold annealed and unannealed specimens in the same mounting. Etching has varying effects on each differently treated specimen, making it difficult to obtain the best results when two specimens having different treatments are etched at the same time. Often it is necessary to polish and etch for one of the specimens and then to repeat the process for the other specimen in the mounting, resulting in waste of time. The difficulties encountered in the final polishing and etching are sometimes exaggerated by the rough polishing, requiring the procedure to be modified to fit the physical limits of the specimen.

Specimens and Preparations

All burrs and cutting marks should be carefully removed from the specimen before mounting. When it is desirable to examine the edge of a sample, that is, an oxidized or carburized surface, extreme caution should be exercised so that this surface is left intact. When it is at all possible, such samples should be ground a small distance below the surface so that the oxide broken in cutting is removed and the clean edge is visible. Even at this early step it is wise to examine the specimens under the microscope to be sure the oxide is visible or that the edge is intact.

Large specimens should be avoided whenever possible, although a specimen descriptive of the material should at all times be used. It is better to use more than one sample and more than one holder when the area to be examined is large.

In mounting strip specimens, it is often necessary to place them first in strips of a similar metal in which saw cuts have been made, as illustrated in Figs. 1 and 2. These cut strips will hold the specimens firmly upright, keeping them separated and in proper order in the mounting.

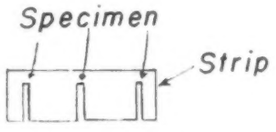


FIG. 1—Cuts made in a strip of metal similar to the specimen metal prior to mounting it.

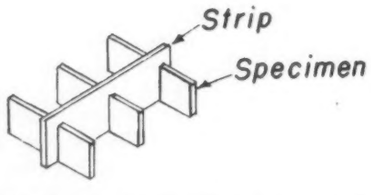


FIG. 2—Mounted in a strip of similar metal, the specimen metal is held firmly upright, keeping it separated and in proper order for mounting.

It has always been difficult to mount extremely small specimens such as fine wires, filaments, etc., in ordinary mounting materials. This problem is satisfactorily overcome, however, by using Cibanite as a mounting material, and five-mil wires shown in Fig. 3A have been successfully mounted and polished in this medium.

Mounting of Specimens

A phenolformaldehyde resin and various thermoplastics were tried at different times for mounting materials, as illustrated in Fig. 3. However, the most practical product, from many standpoints, was found to be Cibanite, a molding resin which contains no filler and is highly resistant to etching reagents. It is the condensation product of aniline, hydrochloride and formaldehyde. The technique of mounting with Cibanite is essentially the same as with phenolformaldehyde except for a few noteworthy points.

The Cibanite powder molds under the same conditions as phenolformaldehyde. It may be started in a cold press and heated until the thermometer, inserted in a well in the top plunger, reaches 135 deg. C and pressure falls. Then the pressure should be pumped up and the heater removed. Care must be used that the inside of the press mold does not exceed 140 deg. C during molding. If the specimen is mounted at a higher temperature, the mounting should be allowed to cool longer under pressure in the mold. Unless this is done, the Cibanite will bubble and expand when released from the mold and this higher temperature may cause cracks in the mounting because of brittleness, which increases with temperature. Charges of molding

Metallurgical Specimens

By BETH WALSH

Technician, Research Laboratory, General Electric Co., Schenectady, N. Y.

resin are measured by volumetric procedure, which necessitates a constant change in the amount used because of variation in density of resin and size of specimens.

Wax of any kind used in the mold will turn the finished Cibanite mounting yellow, indicated in Fig. 4B. To low a molding temperature will result in a crumbly yellow mounting, as in Fig. 4C. Too little Cibanite in the mold will also yield a yellow sample although it will be in a more fused condition, as in Fig. 4D. By experimenting, it is possible to determine more or less the correct amount and procedures for the specific conditions.

The absence of filler in Cibanite is advantageous when it is desirable to remove the specimen from the mounting after it is polished. If the mounting is placed tightly in a vise and hit sharply, the Cibanite will chip away from the specimen easily.

If too much pressure is used in polishing operations, cracks begin to appear, starting at the specimen and extending toward the edge of the mounting, causing difficulty during etching. However, if proper care is used, the cracks do not appear at all.

Using a very minute amount of Glyptal cement on the specimen as it is placed in the mold will keep the specimen upright and in place and as the solvent in the Glyptal cement evaporates as it dries during the molding process, leaving such a small amount of base, there is no mark or blemish on the sample.

Another advantage in the use of Cibanite is that it does not round off so easily during polishing as do many other mounting mediums, making it easier to see the extreme edge of the specimen clearly under the microscope.

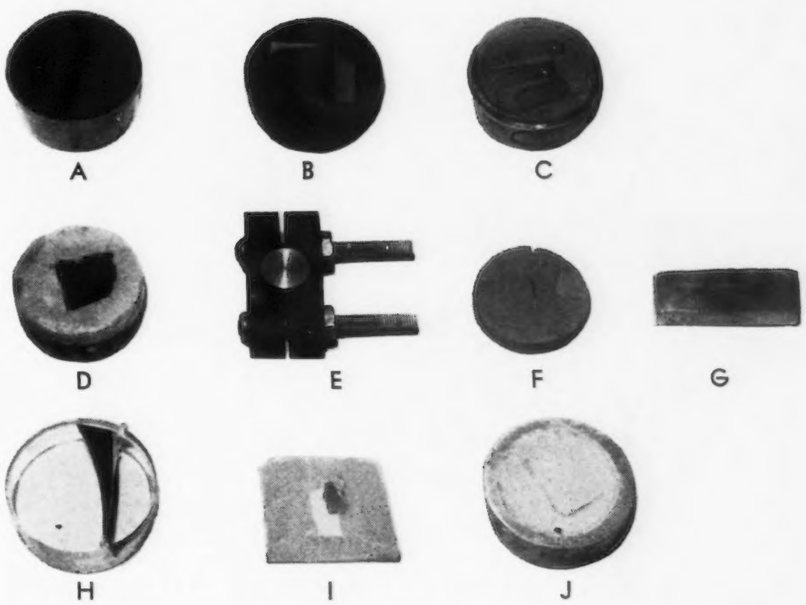


FIG. 3—Various types of mountings for metallurgical specimens have been tried, among them being: A, Cibanite; B, phenolformaldehyde; C, solder in brass holder; D, sulphur in brass holder; E, clamps of phenolformaldehyde; F, Dennison's wax; G, annealed copper (for W wires); H, methyl-methacrylate; I, methyl-methacrylate; J, Litharge and glycerine in brass holder.

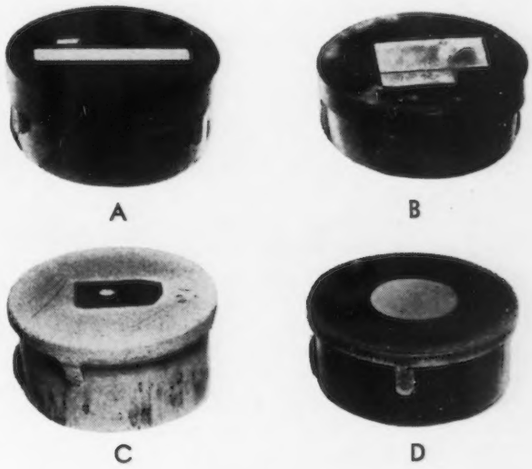


FIG. 4—By experimenting, it is possible to determine more or less the correct procedures for specific conditions in making Cibanite mounts. Some of the results that may be obtained are shown here: A, good Cibanite mounting; B, good Cibanite mounting when a lubricating wax is used in the mold; C, Cibanite mounting when not heated to correct temperature; and D, insufficient Cibanite in the mold.

Supercharger Vanes

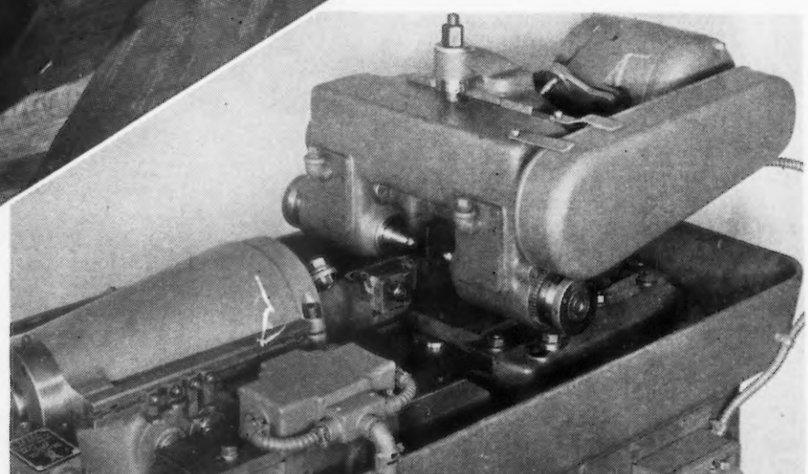
LEFT

AT left the finished supercharger entrance vane for the Allison engine, manufactured by Cadillac. The rough forging, shown at right, weighs 7 lbs. In the manufacturing process it loses 93 per cent of this weight. The photograph shows the 15 curved blades located around the splined hub center. One of the most difficult parts to machine for aircraft engines.

o o o

BELOW

REAR view of the special DeVlieg milling machine developed for high speed automatic production of supercharger entrance vanes. This shows, at the right, the cutter spindle head; in the center, the special indexing fixture, the work holding spindle and at left, trip dogs on work spindle head. This machine cuts on forward and return strokes.



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SUPERCHARGER entrance vanes for the Allison aircraft engine are being produced by Cadillac Motor Car Division of General Motors Corp. on a battery of special milling machines which have reduced production time far in excess of 50 per cent. This appears to be one of the major automotive contributions to the manufacture of aircraft engines.

The supercharger entrance vane is a fan-shaped part 6 in. in diameter having 15 curved blades extending outward from a splined hub. In service the part runs 24,000 r.p.m., requiring extremely precise machining since even very minor variations of the blades from specifications would cause unbalance and impair efficiency.

Before Cadillac took a parts contract for the Allison aircraft engine, these vanes were milled and hand-shaped. Search revealed a process for generating the form of the blades in an automatic machine. The generating was accomplished by establishing a center having a common relation to all of the irregular surfaces. The holding fixture was arranged to hold the part in a position coordinating with a sine bar control for the desired shape.

Indexing is obtained by accurately spaced center-drilled spots around the periphery of the blank, corresponding to the number of blades in the finished part. Into these cen-

Milled Automatically

ter-drilled spots an index element on the fixture registers.

After preliminary steps to turn, bore, broach and machine the special centers, the forging proceeds through the 11 special DeVlieg milling machines which cut on both the forward and return strokes. These machines incorporate, besides sine bar control and other elements necessary for the generation of the curved shape, a special driving means to enable the small cutters (high speed steel) to machine the work rapidly. The cutting cycle is entirely automatic.

The operation sheet for the manufacture of these vanes is as follows:

OPERATION	TOOL DESCRIPTION
(1)-(2) Rough gash teeth	Milling fixture Milling cutter ½ in. dia.
(3) Semi-finish mill back face flat	Milling fixture Milling cutter 0.300 in. dia. Gage for spacing and angles of blades
(4) Rough mill front face flat	Milling fixture Milling cutter 0.312 in. dia. Gage for spacing and angles of blades Special center for supporting cutter
(5) Rough mill front face radius	Milling fixture Milling cutter—convex from type Gage for spacing and angles of blades
(6) Rough mill back face radius	Milling fixture Milling cutter—concave form type Gage for spacing and angles of blades
(7) Finish mill back face flat	Milling fixture Milling cutter 0.305 in. dia. Gage for spacing and angles of blades
(8) Finish mill back face radius	Milling fixture Milling cutter—concave form type Gage for spacing and angles of blades Gage for setting cutter Go and not-go radius gage
(9) Finish mill front face radius	Milling fixture Milling cutter—convex form type Gage for spacing and angles of blades Gage for setting cutter Go and not-go for $\frac{1}{16}$ in. radius
(10) Finish mill $\frac{1}{16}$ in. radius on leading edge of back face	Fixture Milling cutter—concave radius form type Gage for $\frac{1}{16}$ in. radius location
(11) 21-in. Cincinnati drill press for machining of blades	7/32 in. radii at root
(12) Semi-finish mill front face flat	Milling fixture Milling cutter 0.312 in. dia. Gage for spacing and angles of blades
(13) Finish mill front face flat	Milling fixture Milling cutter 0.312 in. dia. Gage for spacing and angles of blades

A series of bench finishing operations are required, including the polishing of the surfaces of the vanes.

The rough forging weighs 7 lb. and 93 per cent of this weight is removed in machining operations.

Since the development of the special milling machine by DeVlieg Machine Co., approximately 60 have been installed in aircraft engine manufacturing plants in the United States.

Ferris Wheel Technique for Spraying

A FERRIS wheel technique, as shown in the accompanying photograph, is used in the automatic spraying of copper or carborundum blocks at the Westinghouse Electric & Mfg. Co. plant. The large wheel picks up the unsprayed blocks which are then sprayed when they reach a certain point on their circular journey. The sprayed blocks are expelled in the trough at lower left. The copper is melted and sprayed in a gas operated gun. No. 12 copper wire feeds into the gun from a large spool, and slow oscillation of the nozzle insures a smooth coating on the ends of each element.

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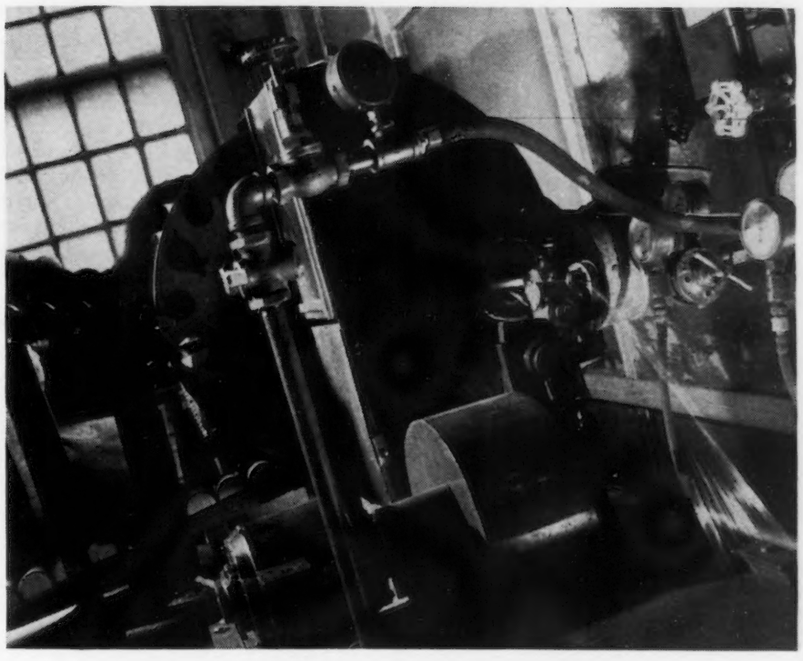
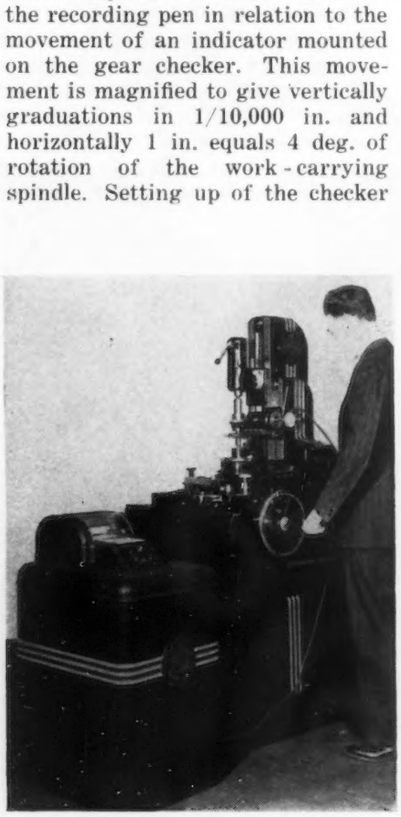


New Equipment

Gages and Small Tools

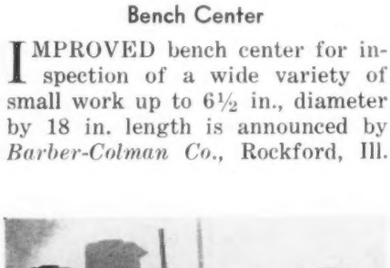
Here are discussed some new developments in precision gages, micrometers, tachometers; in grinders, saw blades, lathe accessories; in tools, electric hand drills, saws, hammers, files, and in markers and etchers.

GEAR checking equipment with chart records of involute form and lead has been announced by *Michigan Tool Co.*, Detroit. Operating on standard 110 volt a.c., it is adaptable for use with any Michigan Sine-Line lead checker or involute checker or with other makes of checking equipment. The instrument is based on the use of synchronous devices, one of which is connected directly to the sinebar table, the other to the chart drive. Connection between the checker and recorder actuates electrically the cross movement of the recording pen in relation to the movement of an indicator mounted on the gear checker. This movement is magnified to give vertically graduations in 1/10,000 in. and horizontally 1 in. equals 4 deg. of rotation of the work-carrying spindle. Setting up of the checker is possible without moving the chart paper. The paper can also move to check the opposite side of the gear tooth. A button release is provided on the chart roll to permit moving it by hand, enabling locating the desired starting point. The Lucite cover has a knife edge to permit tearing off the chart.



Bench Center

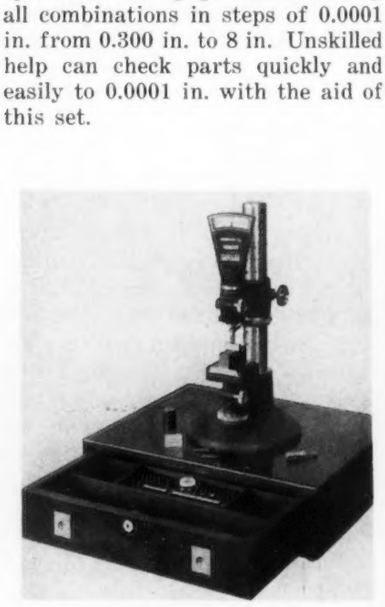
IMPROVED bench center for inspection of a wide variety of small work up to 6½ in., diameter by 18 in. length is announced by *Barber-Colman Co.*, Rockford, Ill.



This center provides an accurate, fast method for inspecting cylindrical and circular pieces. The base is of well ribbed box construction with ways cast integrally. Both headstock and tailstock may be clamped firmly at any point on the bed by quick-acting, powerful clamps. The tailstock has a spring loaded, hardened and ground sliding center which can be locked into position. The headstock center is fixed and all three sliding members locate from the same reference surface. The slide or indicator base is provided with a vertical post and is used with a standard type indicator clamp. Other types of indicator holders can be attached easily, if desired. The design of the ways and clamps insures free, quick and sliding action to the centers and indicator base when they are unclamped. The work is usually inspected by being rotated by hand under a dial indicator which registers the amount of run-out or eccentricity.

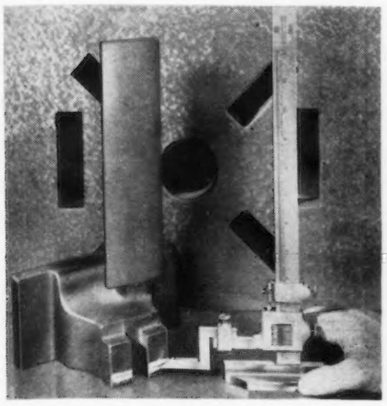
Inspection Set

DESIGNED especially for the checking of precision work is the Comparitol-Inspectoset unit by the *George Scherr Co.*, 128 Lafayette Street, New York. This unit enables any shop to maintain complete control over all gages, mass produced parts, ball bearings, pins and other parts. Included in the unit is the Comparitol which is graduated to read ± 0.002 in. in "tenths" and the Ultra-Chex, Inspectoset of 34 gage blocks making all combinations in steps of 0.0001 in. from 0.300 in. to 8 in. Unskilled help can check parts quickly and easily to 0.0001 in. with the aid of this set.



Offset Markers

OFFSET markers Nos. 585C and 585D increase the usefulness of No. 585 vernier height gages of the *Brown & Sharpe Mfg. Co.*, Providence. Measurements can be taken as low as the plane on which the height gage is placed



and also in shallow recesses. When used in an inverted position they extend the height gage beyond the range of the straight marker. The marker arm is made unusually long, an advantage in measuring over projections. Markers are available in two sizes—3 in. overall for use with the 10 in. vernier and 4 in. long overall for use with the 18 and 24 in. vernier height gages.

Micrometer Head

TO its line of precision tools the *Brown & Sharpe Mfg. Co.*, Providence, has recently added a micrometer head No. 293RS which is available both in English and metric measure. The measuring screw English measure, has 50 threads to the inch and 200 graduations, thus reading directly to 0.0001 in. The metric screw reads to 25/10,000 mm. Graduations are clean cut and easy to read. Length of shank is approximately 31/64 in. and is threaded back ⅛ in. from end of lock nut. Diameter of shank is ⅜ in. and the spindle projects 9/16 in. with micrometer set at zero.

Hand Tachometer

LATEST type of centrifugal hand tachometer by *Coats Machine Tool Co.*, Scarsdale, N. Y., is furnished in three sizes, each measuring five speed ranges. The instruments cover a range from 30 to 24,000 r.p.m. Inside and outside scale are entirely separate, the hand making but one revolution on the dial. The speed ratio has been kept down to 1 to 4 for each measuring range. The instruments give also accurate readings for peripheral speeds.

Precision Timer

ELECTRIC stopwatch, known as Time-It minute model, is announced by the *Precision Scientific Co.*, 1750 North Springfield Avenue, Chicago. It is run by a synchronous electric motor which operates a direct reading counter. Accuracy is covered by the cycle constancy of 115 volt a.c. supply. The device integrates up to 1000 min., reading in full minutes and hundredths. It can be reset to zero from any reading, or successive readings can be totaled.

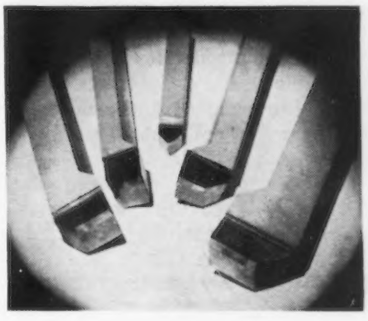
Plastic-Tipped Mallets

PYRALIN tipped mallets are being used in aircraft factories for inspection and assembly work. They are non-sparking and come in

a variety of easily replaceable tips in sizes from ¾ to 2 in. diameter. The mallets will not mar metal nor plated finishes. The producer is *Southwest Mfg. Co.*, 1623 East First Street, Santa Ana, Cal.

New Standard Carbide Tools

FIVE new styles have been added to the line of standard carbide tipped tools by *Carboloy Co., Inc.*, Detroit. Sizes comprise four offset and one two-way square shank turning type. The two-way turning tool has an 883 Carboloy tip for machining of cast iron, nonferrous metals, etc. The various offset tools are available in two styles for steel cutting and for cast

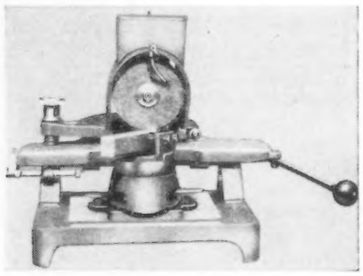


iron and non-ferrous metals. All tools are obtainable in a large variety of sizes, right and left-hand facing and turning tools.

Chip Breaker Grinder

PRODUCTION of the new model A chip breaker grinder is announced by the *Drafto Co.*, 178 Walnut Street, Cochranton, Pa. This machine grinds chip breaker grooves in carbide metal cutting tools and simplifies correct tool adjustment to any angle necessary for accurate grinding. After the angle

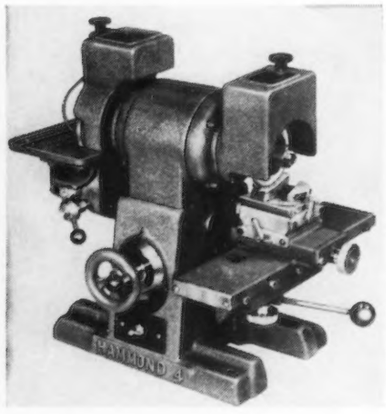
is adjusted stops may be set, locking the vise, but permitting the tool to be removed for final inspection before being locked rigidly for grinding. The grinding element is



a diamond cutting wheel, driven directly by a ¼-hp., 3450 r.p.m. motor. The arm at right of the machine carries the wheel across the face of the tool, grooving the tip. The knob at left on the motor hinge bracket determines the depth of cut. It is graduated for micrometer adjustment. Kerosene tank for lubrication is provided.

Double Duty Grinder

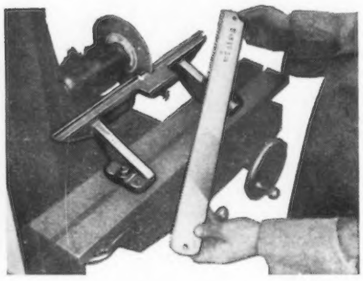
CHIP-BREAKER grooves in carbide tools can be ground with a new bench or floor model precision grinder which has been built around a new type universal angle tool vise for greater accuracy and convenience. The new tool vise provides three planes of adjustment in setting the grinding angle, each adjusted by accurate scales. The vise is mounted onto a reciprocating table and is cross-fed in and out from the base of the machine by means of a calibrated handwheel. The machine's left-hand spindle may be used for rough or finish grinding of carbide tools with a 6-in. silicon carbide or diamond cup wheel. The tilting work table is slotted for protractor angle-



guide. Coolant tanks are fitted for both wheels. Chip-breaker grinder "4" has a ½-hp. motor and is made by *Hammond Machinery Builders, Inc.*, 1612 Douglas Avenue, Kalamazoo, Mich.

Fixture for Grinding Hacksaw Blades

GRINDING and sharpening of power hacksaw blades has been neglected in the past, since there was no economical way to grind such blades. The Quick Way fixture of *Industrial Engineering Co., Inc.*, 311 Sixth Avenue South,



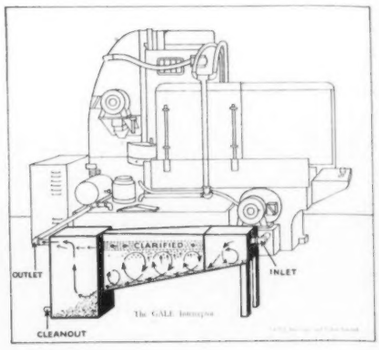
Minneapolis, is claimed to make possible 5 to 10 regrinds, producing a blade which is as good as new. Fixture consists of a rest on which the saw is held by hand, being located endwise by an index feed pawl, which can be adjusted in or out, according to tooth size, or can be left free to oscillate with infeed of blade. Saw is indexed from tooth to tooth by hand. A groove is provided for set teeth so that the back of the blade remains flat.

Tools for Plastics

REPORTS received by *Ampco Metal, Inc.*, Milwaukee, producers of aluminum bronze alloys, are said to indicate that grade 20 Ampco metal has proved very satisfactory as tool bits for the machining of plastics. Thus, a thick-walled plastic cylinder of about 2½ in. outside diameter and 2 in. in length was faced and turned, and it is claimed that the tool bit was in as good a condition after completion of the operation as before, and that the resultant surface was excellent.

Coolant Separator

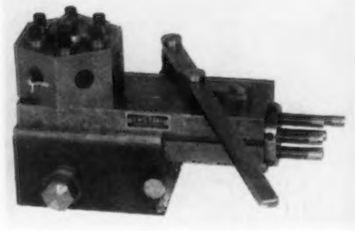
CUTTING oil and coolant can be salvaged, cleaned and reused with the help of a new separator brought out by *Gale Oil Separator Co., Inc.*, Chrysler Building, New York. When the oil flows from the automatics or other machine tools into the separator, the mixture of grindings, metal particles and oil is broken apart by a breaker wedge. Thus the incoming liquid is slowed down, lighter cut-



ting oil and coolant directed upward and the heavier material to the bottom of the interceptor. Through the turbulence at the bottom of the separator the heavier material is riffled and rolled, breaking away from it the lighter oil which is further clarified in another compartment. The heavier material flows into a bucket. The unit operates by gravity, it is said to speed up production by reducing spoilage. It can be built in sizes taking 5 gal. per min. or more.

Accessory Lathe Turret

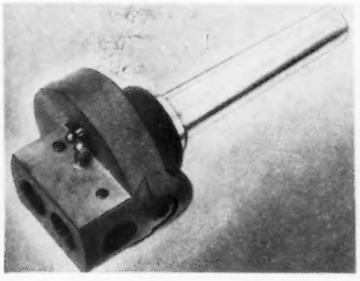
DESIGNED to complete the line of attachments for bench lathes and engine lathes, the *C.W.C. Corp.*, 684 North Prairie Avenue, Hawthorne, Cal., has developed the hexagon bed turret. It has ⅝ in. holes for drills, reamers, turning or box tools which are firmly held by side clamping squeeze-blocks. No set screws are used. The turret rotates as the slide is drawn back and is automatically locked in position by a tapered pin. The individual stops are automatically indexed with the turret. Turret may be revolved by hand also. The slide



is mounted on massive square surfaces for maximum bearing. Adjustments are provided for wear. The turret is produced in four sizes to fit 10 to 16 in. lathes.

Offset Boring Head

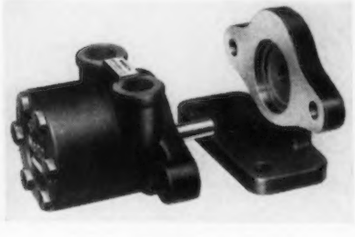
STURDY and compact L & M positive offset boring head has been produced by the *Pacific Tool & Supply Co.*, 344 North Vermont Avenue, Los Angeles. In this head two hardened buttons are checked



with a micrometer before the required hole is cut. One button is attached to the stationary and the other to the moving or adjustable part of the boring head. One button has a flat side and the other is completely round. Thus micrometer screws have been eliminated. The boring capacity of the head ranges up to 15 in. and boring bar hole size is 1 in. The outside diameter of the boring head is 4 7/16 in. and the overall length without shank is 3 11/16 in. Standard shanks available are B&S 9 to 12 and Morse No. 4, as well as straight shanks for use on turret lathes.

Rotary Geared Pump

GEARED pump No. 00 with helical gears which provides smooth, quiet operation at speeds adapting the pump to direct motor drive has been added to the line of pumps of the rotary type of *Brown & Sharpe Mfg. Co.*, Providence. This pump with a capacity of 30 gal. per hr. at 0 lb. pressure and 1725 r.p.m., is a reliable unit for



supplying oil or coolant for general purposes or hydraulic installations where small capacities are desired, and it is suitable for use with pressures up to 100 lb. per sq. in. An oil seal prevents leakage and the bearing surfaces of the stand, end cap and housing are ground to an oil tight fit. Pumps run in one direction only, but are available for both clockwise and counterclockwise operation.

Ready-Mixed Cutting Oils

FOR drilling, reaming and rifling gun barrels for small arms, *E. F. Houghton & Co.*, Philadelphia, announces several new types of ready-mixed cutting oils. Many plants prefer a ready-to-use oil to eliminate the possibility of error in mixing. For drilling W.R. cutting oil No. 5, for reaming and rifling Cut-Max No. 1025 and for honing Houghton's gun barrel honing oil are used successfully.

Electric Hammer

BASED on the principle of operation of a coil spring, the new K-B electric hammer by the *Wayne Pump Co.*, Fort Wayne, Ind., develops an approximately 172 lb. blow 850 times per min. The hammer is actuated by a 110 volt, 50

to 60 cycle, a.c. or d.c. motor which turns a double end cam against which two balls bear. As the cam turns the balls roll apart, compressing the spring. When they drop off the high point, the spring is released and strikes the blow. The balls are retained in alinement by the sleeve and there is no shock or pressure upon them when the spring is released. The hammer has a hardened steel tip, weighs 11 lb., and is 18¾ in. long. The rubber-cushioned, handy grip makes operation easy. Attachments for a number of special applications can be had.

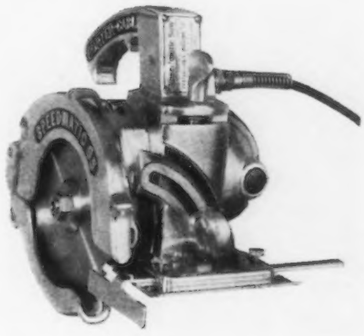
Electric Hand Drill

ACCURACY and speed of drilling operations are claimed to have been improved materially by the SpeedWay ½-in. drill due to the natural grip breastplate handle which produces a more direct application of power. The drill is light enough for portable use, yet heavy enough for production drilling. It has a powerful, high torque, back geared motor, self-alining oilless bearings and forced-air cooling. It is said that the drill's low

load speed makes it particularly adaptable for use with carbide drill bits. The maker is *SpeedWay Mfg. Co.*, 1834 South 52nd Avenue, Cicero, Ill.

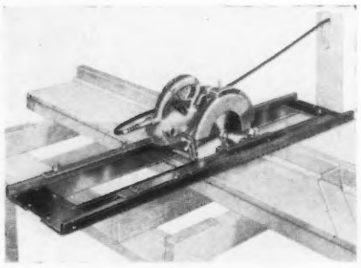
Light Weight Electric Hand Saw

MODEL K-65 high speed electric hand saw is announced by *Porter-Cable Machine Co.*, Syracuse, N. Y. It is perfectly balanced and equipped with a ⅝-hp. universal motor. The base may be raised and lowered for depth adjustment, and tilts to 45 deg. for bevels. A cast-in and enameled graduated scale affords quick and accurate settings. The frame is die cast aluminum. The 6½-in. diameter blade with cutting capacity of 2 in. material, travels at 7200 r.p.m., producing a peripheral speed in excess of 2 miles per min. The tool weighs 15½ lb. It is claimed that the helical gear drive in this tool transmits 98 per cent of the motor power.



Radial Saw Guide

RECENTLY *Fred W. Wappat*, 7319 Penn Avenue, Pittsburgh, introduced the radial saw guide to convert model A-8 in. or



A-9 in. electric hand saw into a radial saw within 2 min. This guide holds the material down upon the table, allowing a stroke from back to front, or work may be placed on the table in front so that threading it through from end to end becomes unnecessary. The guide may be locked for square and angular cuts. Since both electric hand saws operate for depth and bevel cuts, it is now possible to make all cuts on a production basis.

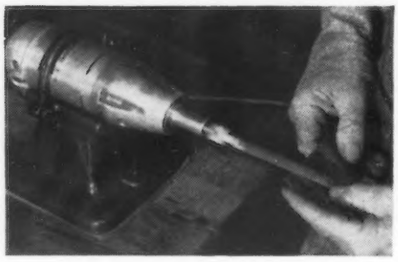
Universal Electric Hand Tool

TWO light-weight, low-cost electric hand tools are brought on the market by *Dremel Mfg. Co.*, Racine, Wis. They operate on 110 volt a.c. or d.c. Model 1 weighs 6 oz. and turns at 25,000 r.p.m.; model 2 weighs 13 oz. and rotates at 27,000 r.p.m. A wide variety of accessories for polishing, grinding,

sharpening, drilling and marking are supplied for these tools, as well as special stands.

Motorized File

MULTI-PURPOSE electric hand tool which can be used efficiently as a file and also for other applications requiring a reciprocating motion has been developed by *H & H Research Co.*, 12540 12th Street, Detroit. Two stroke lengths of $\frac{3}{8}$ and $\frac{1}{8}$ in. permit adaptation of the stroke to the



work. The tool can be used on production work as a hand tool or fixed in a specially designed stand, illustrated, depending on the work.

Reversible Ratchet Wrench

MIDGET pattern reversible ratchet was added by *J. H. Williams & Co.*, 225 Lafayette Street, New York, to their Supersocket line. This tool with $\frac{1}{4}$ in.

square drive, is $4\frac{1}{2}$ in. long. It incorporates a patented double tooth pawl for both "on" and "off" rotations. A convenient shift lever at the head instantly reverses the wrench action. The handle is drop-forged from high tensile carbon steel and working parts are made of Cr-Mo steel. The wrench is finished in chrome plate over nickel.

Saw Blades

SEGMENTAL saw blades combining high production and long life with low cutting cost are made by *Motch & Merryweather Machinery Co.*, Cleveland. The tooth pitch can be suited to any material, thus contributing to speed and accuracy. Segments of tool steel are fitted to a heat treated center and project slightly to protect the body of the blade from rubbing. Teeth are ground to a special form to afford the most favorable cutting conditions. The segments form a closed ring which stiffens the blade and lends additional strength. After segmental teeth are completely worn, the main blade can be reset with new segments without any reduction in diameter, since they are machined to gage and can be exchanged readily.

Spacers for Milling Cutters

MILLING cutter spacers made of synthetic resin have recently been introduced by *Industrial Products Suppliers*, 2 Broadway, New York, under the trade name of Artus spacers. Nonhygroscopic and impervious to oil, the spacers are made in thicknesses from 0.001 to 0.0075 in. with standard diameters and keyways. A different color for each thickness facilitates selection.

Base for Drill Grinders

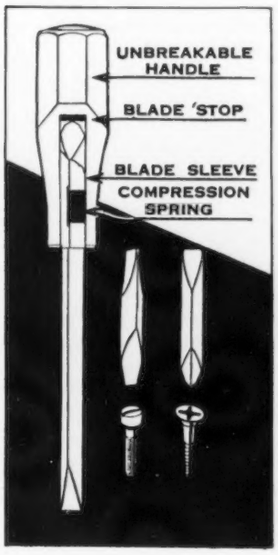
CABINET-TYPE pedestal with work space approximately 13 x 30 in. on which the machine may be mounted for easy operation has been introduced by *William Sellers & Co., Inc.*, Philadelphia. The pedestal is 25 in. high and is constructed of sheet steel of sufficient weight to be vibration free. Top and the three or more shelves are made of wood. Modifications of this model are built to take care of consumers' needs.

Socket and Tool Set

ILLUSTRATION shows the No. TD6 socket and tool set of the *Bonney Forge & Tool Works*, Allentown, Pa. Sockets and attachments included are all ⅜ in. square drive, and made of Cr-V steel, heavily chrome plated to provide a rust proof finish. Containing 40 pieces, it includes sockets from 5/16 to 13/16 in., universal joint, four extensions, speeder, drag link socket, and other equipment.

Screw Driver

FITZEM screw driver is a recent development of *Servwell Products Co.*, 6523 Euclid Avenue, Cleveland. It is a screw driver that can be used on both recessed head and slotted head screws. The blade is reversible and interchangeable. It is manufactured from Cr-Mo steel and the handle is made of plastic. The tool is unbreakable, non-chipping, non-splitting, shockproof, not affected by oil, water or grease and is available in four sizes in various blade lengths.



Portable Tool Air Hose

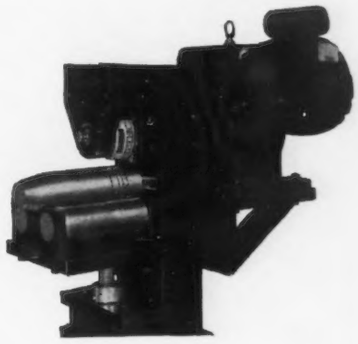
LIGHT-weight air hose so flexible that the 5½-in. size can be bent to a 3-in. radius without collapsing or cutting off the air supply is announced by the *B. F. Goodrich Co.*, Akron, Ohio. Strength and efficiency are said to have been combined with a minimum of weight and ease of handling and to facilitate the handling of pneumatic tools. The new hose is stocked in ½ and ¾-in. sizes. Of two braid construction it can easily withstand working pressures from 80 to 125 lb. with a safety factor of more than 5:1. Compound of the tube is of oil resistant rubber with good heat resisting characteristics. The tube does not flake or clog tools.

C-Clamp

DESIGNED for use in the erecting shed of workshop, *Knu-Vise, Inc.*, 16841 Hamilton Avenue, Detroit, introduces the Klampacto as an improvement on the toggle-action C-clamp. The clamp combines the deep throat of the standard model with the holding pressure of a toggle movement. The lower jaw clears the work when released. Mere hand grip can produce 2000 lb. pressure. It is furnished in three models with a 5, 6, or 10-in. jaw and threaded spindle and locknut. Also, a special adjusting rod can be supplied when the clamp is used in arc welding work.

Shell Marker

MOTOR driven shell marker No. 1 for marking around the circumference of rough forged or finished steel is produced by *M. E. Cunningham Co.*, 115-117 East Carson Street, Pittsburgh. It is made from steel plates to assure solid, sturdy construction with a minimum of weight. Marking die is made to take either individual interchangeable type or solid stamp inserts, which can be supplied in a quality to assure the maximum of service and safety. It rotates continuously to eliminate the need for a clutch. A red and green colored plate on the outside indicates when the die is in position to allow the insertion of the shell.



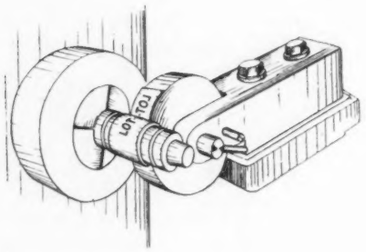
Marking Machine

DESIGNED by *T. H. Matthews & Co.*, 3942 Forbes Street, Pittsburgh, for high speed marking of shells, this unit is also suitable for fast and legible marking of many other symmetrical rounds, such as couplings, heavy tubing, etc. It will mark shells or other round parts from 1¼ to 6 in. diameter, and has a capacity of 10 to 40 pieces per min. This machine is furnished complete with approximately 18 in. of gravity feed ways and 10 in. of gravity take away. The machine is entirely automatic; it selects, marks and ejects the shell. This machine uses a ¾-hp. geared head motor. This firm also produces a time ring marking device as a small, compact bench mounting fixture. It is suitable for marking fuses, beveled dials, etc.,

that require graduation marking. Since the application determines the design of the fixture to a large extent, the unit is built especially for each application. Production will vary from 100 to 600 markings per hour. Depth of lettering for both machines can be adjusted.

Automatic Marking Tool

RECENTLY the *New Method Steel Stamps, Inc.*, Detroit, introduced a rotary or roll type marking device in which the letters or figures are interchangeable. Numerous installations on automatic screw machines and turret lathes have shown their ability to make clean cut impressions in high production. The die is mounted in a holder which has a fine adjustment



for starting the marking when brought into contact with the work. After completing the marking operation, the roll is returned to the initial position by a coiled spring mounted on the end of the roll shaft to which the die is keyed, and continued contact with the part after marking does not mean a marring of the surface. Only a single impression is made.

Thin Elastic Stop Nut

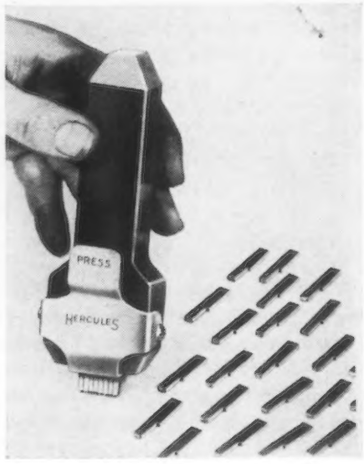
IMPROVED line of thin hex nuts is made by *Elastic Stop Nut Corp.*, 2332 Vauxhall Road, Union, N. J., for shear bolts subjected to high lateral stresses and general applications on light and medium stress fastenings. These nuts have approximately 40 per cent of the strength of standard-height nuts and have been developed to provide a self-locking, space and weight saving fastening. They are approved for use on aircraft. Self-locking action is due to a vulcanized fiber collar, built into the head of the nut, which resists the entry of the bolt and forces the nut outwards, taking up all the thread play. The non-metallic fiber is resilient, does not deteriorate under vibration, and continues to hold the threads of nut and bolt in constant pressure contact. Nuts are available in steel, brass, aluminum, in a complete range of sizes and threads.

New Illuminated Magnifiers

THE latest addition to the line of illuminated magnifiers and microscopes made by *E. W. Pike & Co.*, Elizabeth, N. J., is the new Flaw-Finder, powered with Bausch & Lomb's double lens system of 7½ magnification. It is illuminated by Eveready dry cells No. 935, or by 110-120 volt line current. Both types are interchangeable. The instrument is easily carried, being of the "hip-pocket" design. It can also be used as a flashlight.

Stamp Holder

FOR faster numbering with a tool that will withstand continued use, the new hand style heavy duty Hercules holder has been developed by the *Acromark Corp.*, 251 North Broad Street, Elizabeth, N. J. It is made of shock resisting tool steel with the head drawn to prevent peening and mushrooming. The thumb clip for holding the type is also made of steel and holds the type by its oversize shoulder. This assembly is claimed to be advantageous in saving type and marking more clearly.



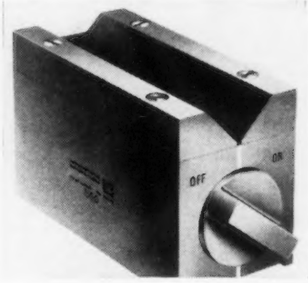
Electric Etcher

SMALL etcher, the No. 9 "Thin Line," for marking tools and parts permanently is announced by the *Ideal Commutator Dresser Co.*, 1925 Park Avenue, Sycamore, Ill. This marker writes a fine line, burning the writing electrically

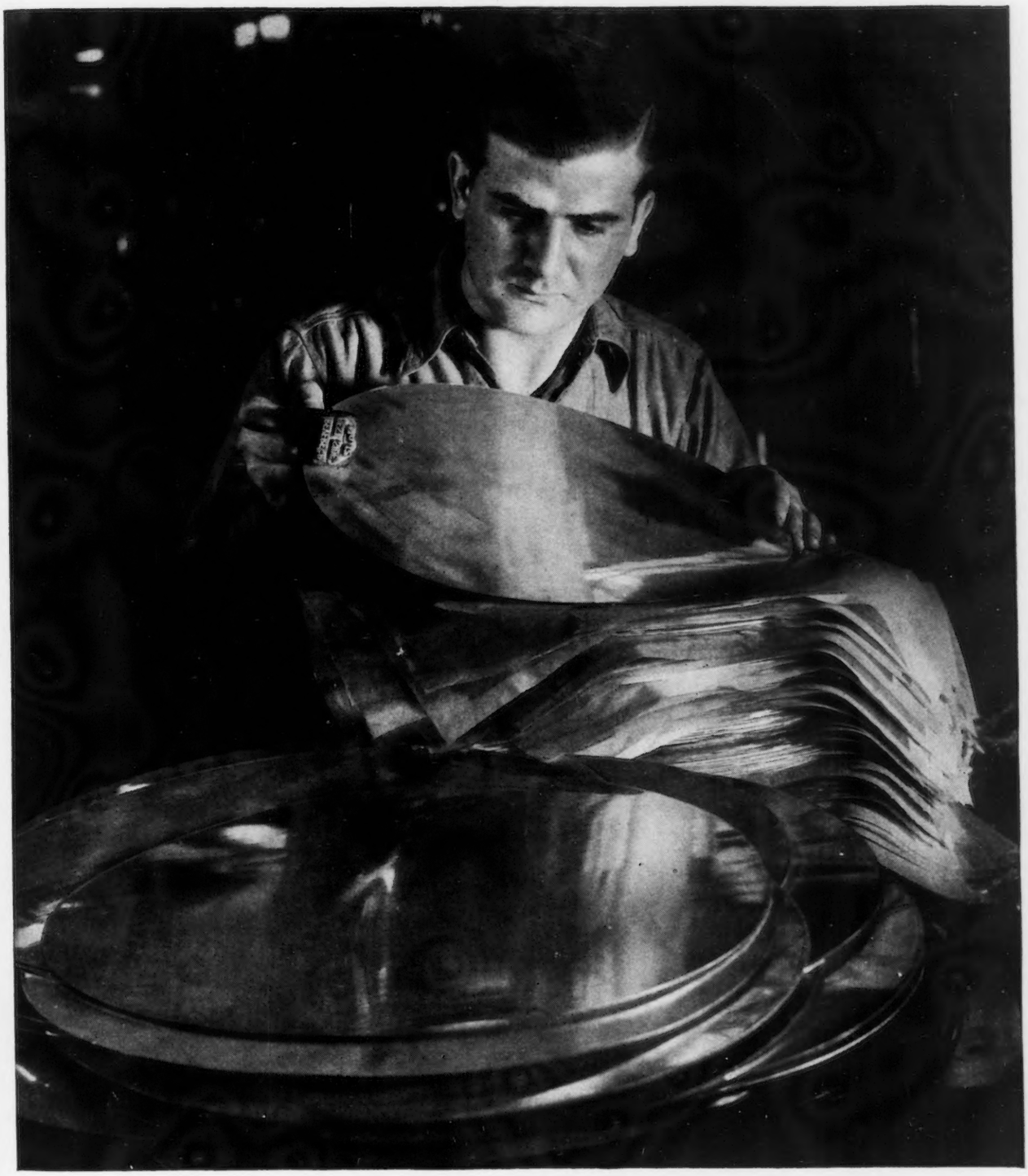
into the metal. Ferrous tools and parts must be placed on the work plate, the inside of the cover for marking. Etcher tool is then used as a pencil. All parts of the 4¼ x 4¼ x 7 in. unit are fully enclosed. The etching heat is 125 watts, the marker weighs 5¼ lb.

Magnetic V-Block

PERMANENT magnet type V-block No. 750 D was recently brought out by *Brown & Sharpe Mfg. Co.* It is of a convenient size with a width overall of 2½ in., height of 3¼ in., length of 6¼ in. and a V-diameter capacity of 1¾



in., making it a handy tool for holding work of round or rectangular cross-section as well as irregularly shaped pieces. The magnetic flux can be turned on and off by rotating a shunt block through 90 deg.; in the on-position the flux passes through the piece to be held and through the conductive surface on which the block rests. The magnet will retain its holding power indefinitely. The block is machined and ground to a high degree of accuracy.



A "BRASS HAWK". When Revere Copper and Brass Incorporated receives your order, a corps of men take your interests in charge. Acting virtually as an arm of your own organization, they watch the materials in your order through each production stage, from casting shop to shipping platform. One of these "brass hawks" is Dominick Lombino, schooled in the critical inspection methods developed by Revere. His skill, in knowing what to look for in copper and copper-base alloys, helps to make Revere products so trustworthy. He, and dozens of inspectors like him, are a part of the painstaking Revere service which is now showing its value for defense by insuring the fitness of the materials you order from us. Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Auto makers believe each company can produce its quota any time in 6-month period starting Aug. 1 . . . August schedules heavier than in same month of 1940, when 90,435 cars and trucks were built.

DETROIT — While it is known that the automobile industry is committed to a nominal 20 per cent reduction in output of new models after next Thursday, it has been impossible until now to forecast any production curve for the industry. Largely this has been because of difficulty in finding out just how the 20 per cent curtailment would be applied.

As an example, one steel supplier, at least, has gone on the assumption that it will be a day - by - day, week - by - week and month - by - month curtailment, with the corresponding periods of last year serving as the base line.

This now is known to be definitely wrong. Authorities within the industry interpret the curtailment agreement as referring only to the total number of units produced and point out that the six-month period beginning Aug. 1 is the yardstick. In other words, the total number of units to be produced by the automobile industry between Aug. 1 and Feb. 1 of the forthcoming model year must be held within 80 per cent of the number of units produced in the corresponding period of last model year.

On this basis, it is understood by the industry, it will be permissible for each company to produce its total quota any time in the six-month period. It is expected that while steel and other materials remain available they will be used up as rapidly as delivered to the auto industry. Automotive buyers are "hounding" suppliers to deliver every possible load of parts and every ton of material that can be shipped for August production. Some schedules are heavier than they were last August when 90,435 cars and trucks were built. As an instance, it appears probable that Ford will produce 6,600 units a day in August this year; that is at the rate of nearly 140,000 vehicles, if sustained. Probably the change-over will result in some delay, preventing such high output, but that is the trend.

Curtailment To Be Delayed

It is anticipated that production will accelerate after new models are put into production, that the high output will be maintained as long as possible, and that curtailment will actually become effective some time in the second half of the six-month period.

If this course is followed, the shock of adjusting to a much lower employment level will be eased a bit. Otherwise, an estimated 96,100 automobile workers in Michigan and 155,000 in the nation would be deprived of jobs immediately. The relief is only temporary, however, and prospects are that they, perhaps many more besides, will be out of work by late fall. The defense program in this area is expected to absorb only 30,000 workers by October and is not likely to absorb 100,000 workers even by the first of next year. Projecting this analysis up to June 1, 1942, offers little hope that there will be enough defense jobs to employ men who will be thrown out of work by curtailment.

This unwelcome surplus of labor will be a headache in Michigan for many months to come and is not likely to benefit the nation or the defense program. The majority unemployed will be in only semi-skilled ranks, including assembly line workers and machine operators, and can be absorbed only slowly into jobs requiring higher skill.

A true picture of the forthcoming six months in the automobile industry must take into account more than the 20 per cent nominal curtailment. From the high-production plateau of the past six months, the total output in the next six months will represent a 38 per cent drop in number of cars produced, in materials used, and in man-hours of labor. This is particularly interesting in any discussion of steel supplies. It has been interpreted to mean that in the next six months the auto industry will "save" about 1,600,000 tons of steel, since this will represent the reduction under the February-July consumption. Doubling this (for a 12-month period) indicates a saving of 3,200,000 tons of steel—approximately one-third of the alleged prospective shortage of steel.

From within the automobile industry there have come some other figures on materials that are pertinent. The next six months should show a saving of 87.4 per cent in primary aluminum; 33.8 per cent in secondary aluminum; 76.1 per cent in nickel steel; 70.1 per cent in zinc; and 71.7 per cent in tungsten. That's a lot better than a pots-and-pans conservation program! It means 13,000,000 lbs. of primary aluminum; 4,000,000 lbs. of secondary aluminum; 185,000,000 lbs. of nickel steel.

With certain officials now talking day after day in Washington about forcing further curtailment in the auto industry, it might be well to keep in mind the fact stated above: That the nominal 20 per cent curtailment actually will represent a 38 per cent drop.

As a matter of fact, nobody in the auto industry can understand the apparent antagonism directed against the automobile industry. There can be no questioning that this industry has exerted every effort in the direction of expediting the defense program, is seeking

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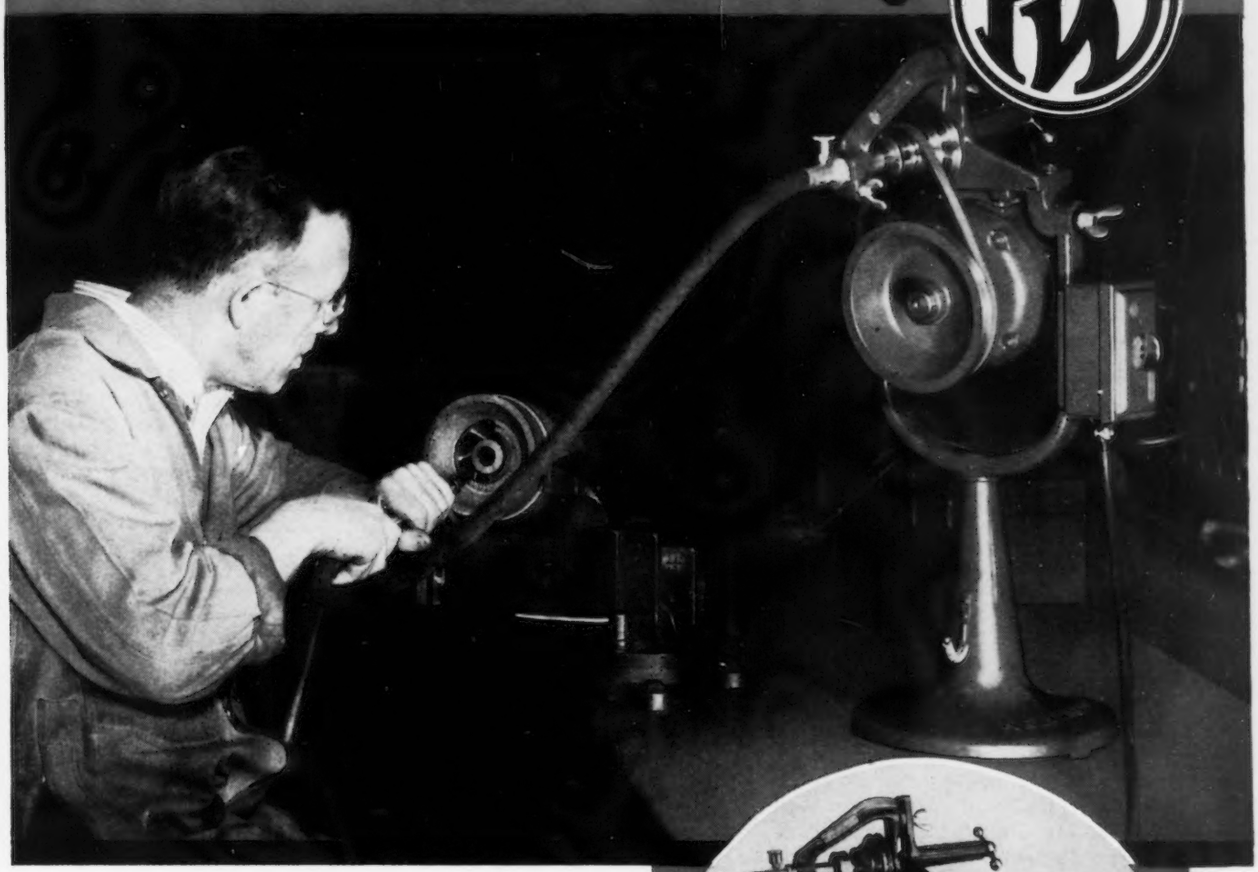

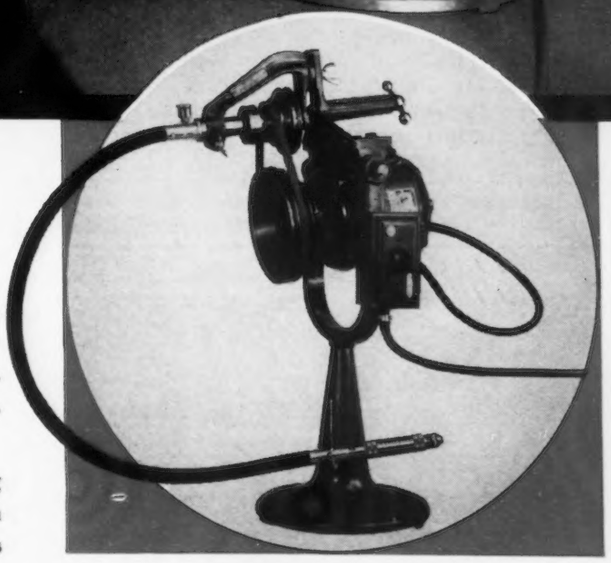

The Kellerflex JB-1 machine, shown here, has a ¼ H.P. totally enclosed motor with an overload switch. Speeds available for this model range from 875 to 6800 R.P.M.

RIGID quality has reaped its reward . . . defense industries have found that they can depend on the trouble-free operation of Kellerflex machines and equipment. Their power and flexibility can be used constantly . . . 24 hours a day—every day.

Check the grinding, burring, sanding and polishing jobs in your own plant and remember . . . you can push your Kellerflex equipment to the limit—it was designed for the long, tough jobs as well as intricate precision work.

Headquarters for the finest flexible shaft equipment.

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Kellerflex Sales Department

more and larger defense orders in Washington so it can continue to do its part, and faces without chagrin the knowledge that it must slow up drastically on the building of automobiles when material becomes impossible to obtain. The only objection voiced by anyone in the industry is against the constant shouting of threats of more curtailment by edict every day.

Observations of quotations attributed to government officials in virtually every edition of every newspaper leads to the conclusion that some of them are more interested in halting automobile production than in expediting defense production—at least that seems to be the direction that all their efforts are taking.

No Difficulty in Finding Machines

Some pertinent observations on the defense program have been offered by a defense official who prefers to remain anonymous. Sharply critical of political propaganda that harps on the theme of getting every half-worn-out machine working on defense, he asserts that OPM has had no difficulty in locating facilities to do defense work. There are exceptions, of course, but the over-all picture is one of hundreds of big and little manufacturing concerns literally clamoring for orders in defense work that will take up the slack they are already feeling in civilian production. Many, deprived of materials essential to them, are being forced out of business. Reinforcing this is the statement of an automotive industry spokesman that the big auto plants are diligently seeking more defense work in Washington to offset their prospective slack period just ahead. "Give us the contracts; we've got the facilities," is the tenor of these remarks.

Failure to release orders, pinned by first-rate authorities on the Army and Navy, is said to be the big factor in the slowness of the defense program so far. It is not inferred that the granting of more contracts would have resulted in any more actual assembly of tanks or guns in the Detroit area, for instance, because the tooling program has necessarily required all of the last year. But earlier letting of contracts would have meant more production of armament of various sorts next winter, perhaps, and more rapid utilization of manpower.

Some automotive plants have already started their brief shutdown for model changeover and the others will follow in rapid order within the next few weeks. Model changes are difficult to describe since they are almost entirely concerned with mere modifications of lines of sheet metal that will result in altered appearance. Most describable is Packard's swing to fenders which flow back into door panels, as on the Clipper introduced late this spring.

Changes in materials will be noteworthy some including the advent of a plastic upholstery material to replace textiles. Chemical companies are manufacturing plastics in thread-like form and they are being woven into seat covering.

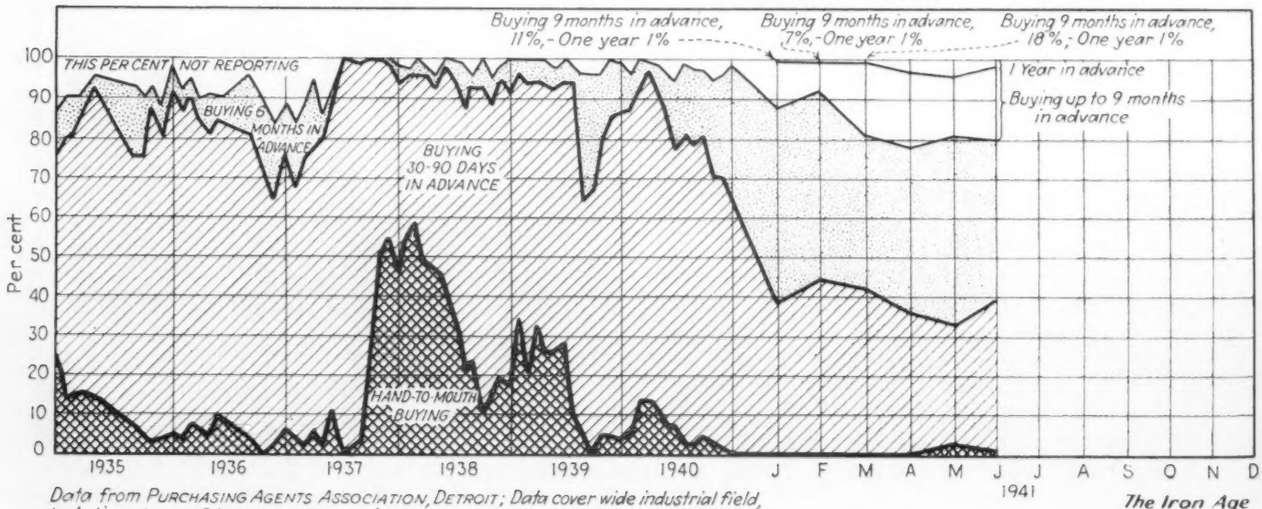
One of the HCC first vehicles to eliminate stainless steel and chromium trim was seen here last week. It was a test model with stamped steel grilles, lacquered a shade or so darker than the body. Trim around the grille and in a broad strip back over the hood to the windshield was a band of cream colored plastic apparently extruded to shape.

Automobile Production Down

It is reported that one of the toughest problems the industry has had to face in locating alternate materials is that of finding a substitute for aluminum pistons for hydraulic brake cylinders. Aluminum is tough, light and noncorrosive, so it has been found very useful for this application. Other materials have been tried with only moderate success, largely because they lack the property of being non-corrosive.

Automobile production is down moderately this week due to changeovers. Total output for the week was 109,912, compared with 114,318 last week and 53,020 in the corresponding week of last year, according to Ward's Reports, Inc.

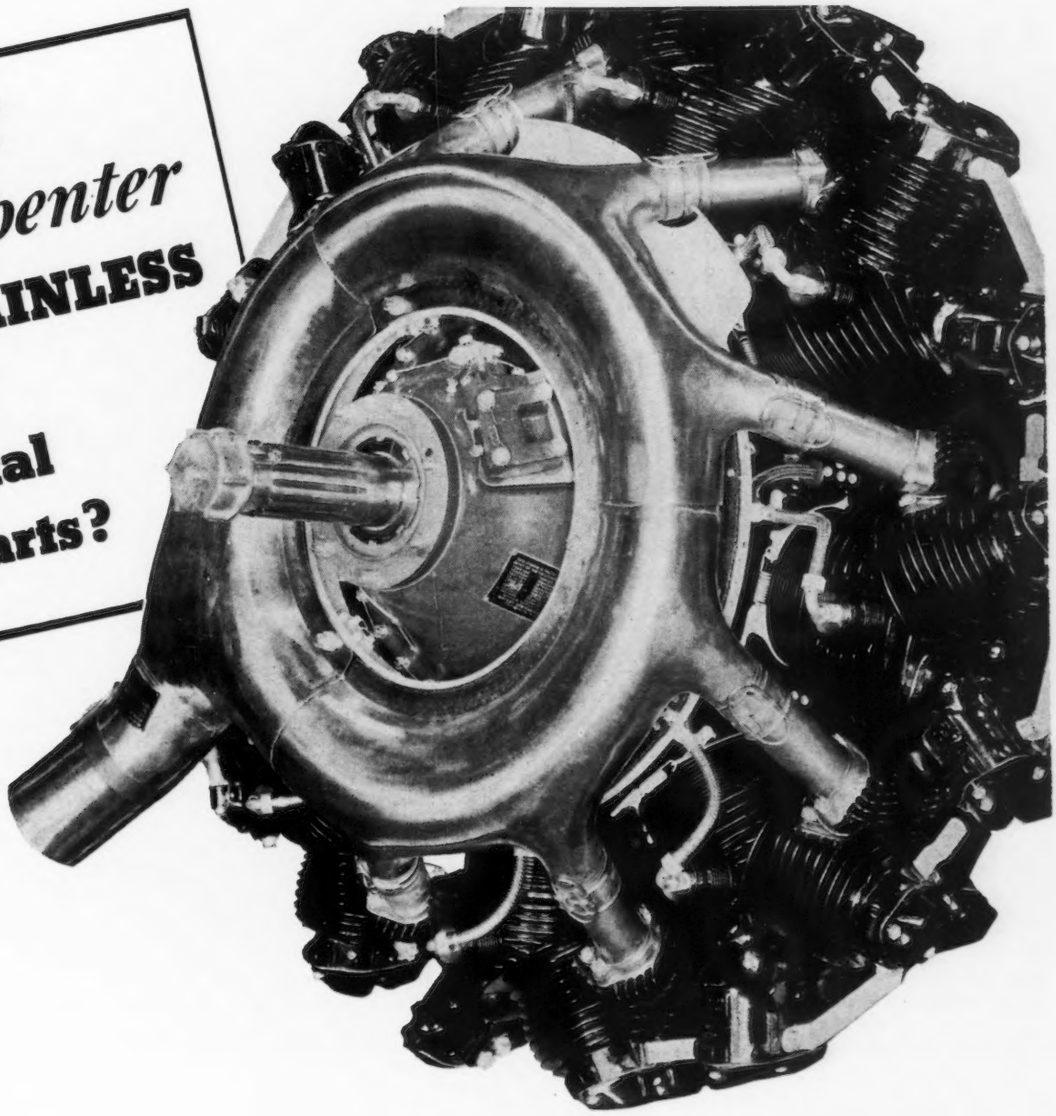
BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from PURCHASING AGENTS ASSOCIATION, DETROIT; Data cover wide industrial field, including stove, refrigerator office equipment, steel, auto parts, accessory, auto plants, etc.

The Iron Age

WHY *Carpenter* STAINLESS for vital parts?



Where safety is paramount—where performance is all important—where the reputation of a product is at stake—that's where you will find Carpenter Stainless Steels in use. Their controlled temper, accurate gauge and uniform physical properties have made them a favorite with the aviation industry.

Manufacturers and pilots alike have confidence in the performance of Carpenter Stainless Steels in corrosion and heat resistance applications on airplanes. The faster working qualities of these steels are helping to speed the production of planes.

In this engine, Carpenter Stainless Steels are used in valve seats, carburetor air intake screens, butterfly valves, cotterpins and inserts. In some models, valves and exhaust manifold nipples are also made from stainless steels. So it's dependability, combined with easier working qualities, which account for the use of Carpenter Stainless Steels in vital parts.

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Washington

BY L. W. MOFFETT
Washington Editor

• "Politics as usual" interferes with efforts to prevent inflation by controlling prices . . . Difficulty in keeping wages in line threatens price structure . . . "We'll be unpopular," Leon Henderson reports.

WASHINGTON — Steel, scrap and other industries fell in line with OPACS and voluntarily accepted ceiling prices. Much was made of the steel price schedule. Steel, it was pointed out, is a key industry whose price policy governs the entire industrial price structure. Since the necessity of a balanced price structure has been emphasized it was urged that the start of price fixing should be made with steel.

Effort was being made, it was urged, to establish and maintain a proper relationship between industrial and agricultural prices which were said to be too low. It was therefore contended that it was desirable to increase agricultural prices with boosting industrial prices.

Now, as Price Administrator Leon Henderson has pointed out, prices are going up.

"We will deceive ourselves," he told the New York Housewares Manufacturers Association last week, "if we believe that the cost of living will level off shortly and everything will be all right. Costs and prices of many consumer items have already risen at the wholesale level—it's only a question of time lag when they will hit the pocketbook."

He went on to explain that Congress has established a policy of 85 per cent parity loans for agricultural products, "thus implementing promises given to farmers over recent years." The commodity markets, he said, under this impluse, and further strengthened by necessary food purchases, have reflected these loan rates. This was given as the main explanation of the rise in domestic food costs. Parity loans, wage increases and ocean freight rates were listed as real cost items.

So Mr. Henderson again served notice that the government must stiffen its control over prices—"no matter how onery and belligerent the outcries become. We do not expect to be popular—in fact, I've said recently the honeymoon is over. We expect to be judged by our fairness, and only the judgment of time can tell that. In other words, OPACS expects to barge ahead in the fight against inflation."

Progress Being Made

The President conferred with Mr. Henderson and Wayne Coy, White House-OPM liaison officer, last week after which the President said progress was being made regarding the price control situation. He did not say how much or what kind of progress and there is in consequence puzzlement as to how far the Administration will go respecting price legislation, now being drafted following a meeting Congressional leaders held with Vice-President Wallace and Mr. Henderson. Belligerency of farm and labor groups to price legislation — labor fearing wage control—in all probability will mean that there will be no full blown price legislation. The Administration itself is likely to tip-toe very lightly when it comes to doing anything that will raise the gorge of these important political blocs. Without control over agricultural prices and wages, price control legislation would be like a play of Hamlet without Hamlet. Inflation, which is the devil that OPACS says it is trying to scourge, would be on the loose.

The Administration plan, it was indicated, is to establish ceiling prices for commodities which are out of balance but it may be assured that the farm bloc will meet no great resistance in cutting off control of agricultural products—or most of them, in any event, "Politics as usual" will save the day.

The President will not adopt the Baruch plan of freezing all prices as of a certain date. In fact, the President said, without a trace of humor, that he had never heard of the Baruch plan. Mr. Baruch is a regular visitor to the White House. The President's statement has been taken to mean, as he indirectly implied, that in fixing prices discrimination should be exercised both as to the commodity and the locality. Search is being made to find a "base period" rather than a given date to "freeze" certain prices, since an overall freeze is out of the picture.

Moral Suasion May Be Tried

There will not be wage control legislation. Mr. Henderson heretofore has said industry was able to absorb wage increases but concedes that further increases in the same industries would require price adjustment. Since he has also said definitely that he will not force any manufacturer into the red, the conclusion is inevitable that added wage increases will mean higher prices. Higher prices, it is insisted, means inflation—the thing that all the shooting is about.

It may be that the rather impotent force "moral suasion" will be attempted by way of wage control. This view is gathered from the President's not very illuminating statement in connection with wage control that the Administration is trying to keep things in balance.

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***1** Am I getting the best lighting for my business, competently planned by lighting engineers?*

"How much light do I need? How much can I afford to spend and what results can I expect from this new light source?"

Don't guess. Ask your G-E lamp distributor. He has behind him all the engineering resources of General Electric. He can call in local G-E engineers, averaging 16 years experience with General Electric, for help and advice so essential to the proper installation of fluorescent lighting. Your electric service company can also give you sound, up-to-the-minute help.

***2** Am I getting a sufficiently wide choice of fixtures so that I can select exactly the ones I need?*

"Have I looked over *enough* fixtures to be able to choose the ones that suit *me?* Am I getting fixtures on the basis of the amount of light I need, rather than on price alone?"

Ask General Electric! G. E. makes no fixtures for MAZDA F lamps, but cooperates with leading fixture manufacturers to assure fluorescent units geared to your requirements. More than 100 different types of tested, certified, guaranteed fixtures are now available. Your G-E lamp distributor carries many of them. See his complete line!

***3** Am I getting Certified Fluorescent Fixtures for top-notch lighting and dependable operation?*

"Will my fixtures start quickly, work efficiently, stand up under long usage? How can I be sure?"

Insist on tested, *Certified* guaranteed fixtures such as those with Fleur-O-Lier label or industrial fixtures with RLM label. Fleur-O-Lier fixtures are tested and certified by Electrical Testing Laboratories to meet specifications set up by MAZDA lamp manufacturers. You get a complete, written Fleur-O-Lier manufacturer's guarantee; and fixtures, ballasts, and starters that help give full light for current consumed.

***4** Am I getting the right lamps — lamps that will give maximum light for current they consume?*

"Will the fluorescent lamps I buy give maximum light throughout life at low cost? Can I get the same high quality which has made G-E MAZDA incandescent lamps a standard of performance?"

You can if you specify G-E MAZDA F lamps! . . . lamps that must pass hundreds of tests set up by MAZDA research. As a result of continued improvements, today's G-E MAZDA F lamps cost as much as 52% less than when G.E. produced the first practical fluorescent lamp. Yet they give up to 40% more light!

G.E. ANNOUNCES NEW LOW PRICES ON MAZDA F LAMPS

Effective August 1, 1941

14-watt T-12	was $1.05	NOW	90c
15-watt T-8	was 85c	NOW	75c
15-watt T-12	was $1.10	NOW	95c
20-watt T-12	was $1.10	NOW	95c
30-watt T-8	was $1.10	NOW	95c
40-watt T-12	was $1.60	NOW	$1.35
100-watt T-17	was $3.50	NOW	$3.00

Above prices refer to daylight and 3500° white.
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Please send me your new booklet, "Let Fluorescent Lighting Roll Back the Roof".

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Bethlehem Yards Ahead of Schedule, A. B. Homer Reports

Washington

• • • **A. B. Homer, Bethlehem** Steel Co. vice president in charge of shipbuilding, told the special Senate committee investigating defense last week that despite difficulties faced by his company in securing materials, its work on the government shipbuilding program is ahead of schedule.

Mr. Homer described briefly the magnitude of his company's shipbuilding operations, and advised Committee Chairman Harry S. Truman that the company has $1,388,000,000 in uncompleted work on all contracts, exclusive of new plant facilities. The Bethlehem company, he said, will deliver 20 vessels during the remainder of this year, 86 in 1942, and 75 during the following three years.

"Our biggest job, as I see it now, is to get materials in the yards when we need them," Mr. Homer testified. "Of course, that involves priorities, and all that goes with them."

Bethlehem Steel Co. has an organization whose sole job is to get the materials into the shipyards, Mr. Homer said. Through its efforts, the shipbuilding program handled by Bethlehem is ahead of schedule. On the battleship under construction at Fore River, Mass., the time has been reduced by seven months. Light cruisers at the same yard are from three to four months ahead of schedule.

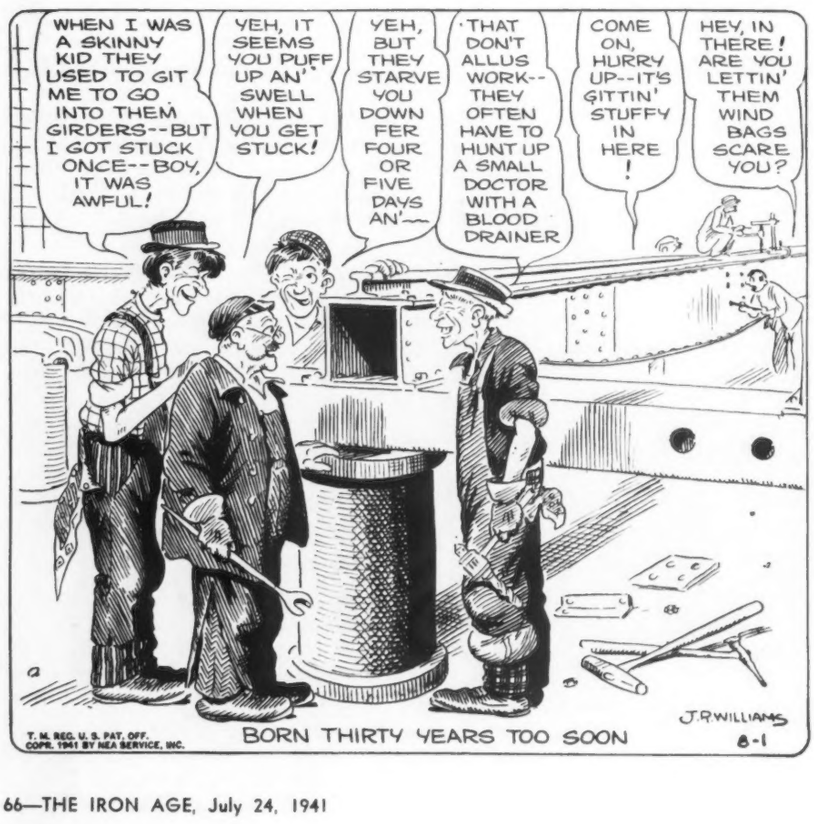
The company is encountering some delay in obtaining machine tools, but doesn't foresee any resultant delay in its shipbuilding program. It faces no electric power shortage and expects no difficulties in the way of an inadequate labor supply. Mr. Homer forecast employment by the company of 42,000 "production employees" in 1942.

Senator Truman, whose committee has been investigating charges of excessive profits on government contracts and alleged irregularities in the defense program, was told by the Bethlehem spokesman that the company would not follow the practice adhered to during World War I in giving large bonuses to officers, that it employs no paid lobbyists in Washington, that its paid workers include no Army or Navy officers. One retired Navy captain, the committee was told, is employed in the relatively minor role of handling general Navy correspondence.

Arthur B. Homer

Out of an estimated $1,388,000,000 in value of uncompleted work on all contracts, $1,033,000,000 represents ships to be constructed within a 5-year period; $27,000,000 for ship repair and miscellaneous products; $308,000,000 for contracts held by the steel division for all classes of steel products for national defense. The contract value of direct national defense work, excluding new plant facilities now in progress, was estimated at $1,228,942,000. Mr. Homer placed the cost of new plant facilities undertaken by his company and financed by the government at $23,607,000; and those to be financed solely by the company at $56,000,000. The latter figure includes a $52,000,000 expansion in the steel division and $4,000,000 in the shipbuilding division.

THE BULL OF THE WOODS — BY J. R. WILLIAMS


WHEN I WAS A SKINNY KID THEY USED TO GIT ME TO GO INTO THEM GIRDERS--BUT I GOT STUCK ONCE--BOY, IT WAS AWFUL!
YEH, IT SEEMS YOU PUFF UP AN' SWELL WHEN YOU GET STUCK!
YEH, BUT THEY STARVE YOU DOWN FER FOUR OR FIVE DAYS AN'—
THAT DON'T ALLUS WORK--THEY OFTEN HAVE TO HUNT UP A SMALL DOCTOR WITH A BLOOD DRAINER
COME ON, HURRY UP--IT'S GITTIN' STUFFY IN HERE!
HEY, IN THERE! ARE YOU LETTIN' THEM WIND BAGS SCARE YOU?
T. M. REG. U. S. PAT. OFF. COPR. 1941 BY NEA SERVICE, INC.
BORN THIRTY YEARS TOO SOON
J.R.WILLIAMS
8-1

Stettinius Sets Up 8 Commodity Branches

Washington

• • • **Following out the** recent reorganization plan of OPM, Edward R. Stettinius, Jr., has set up eight commodity branches to deal with problems relating to metals and other materials in which importation or allocation is a paramount matter. Each commodity branch has a chief who is in charge of all matters considered by the branch, whether these problems are related to priorities, production or purchases. Mr. Stettinius is director of the branches, Philip D. Reed is deputy director and C. H. Matthiessen, Jr., is assistant deputy director. Dr. C. K. Leith is technical consultant, Dr. W. Y. Elliott is consultant on import shipping allocation and Marshall J. Dodge, Jr., is administrative assistant. A consultant on stockpiling is to be named. Under the new arrangement any problem relating to any one material will be handled centrally within one unified commodity branch.

The chief and materials of each section follow:

Section 1—Dr. Harry S. Rogers, rubber, synthetic rubber and cork.

Section 2—David A. Uebelacker, nickel.

Section 3—Harris K. Masters, tungsten, molybdenum, vanadium, cobalt, antimony, and beryllium.

Section 4—John A. Church, copper, zinc, brass, cadmium, and other copper alloys.

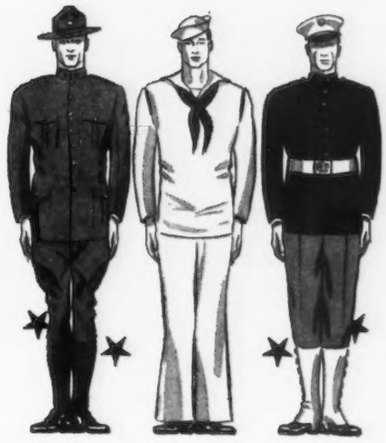
Section 5—Andrew Leith, manganese, chrome, ferro-silicon, zircon, titanium and rutile, columbium, tantalum, and their alloys.

Section 6—Erwin Vogelsang, tin, lead, illmenite (pigment).

Section 7—Howard Sykes, mica, fluorspar, cryolite, graphite, magnesite, and gypsum.

Section 8—Richard J. Lund, asbestos, mercury, industrial diamonds, quartz crystals, platinum metals, radium, uranium, kyanite, abrasives, diamond dies, and jewel bearings.

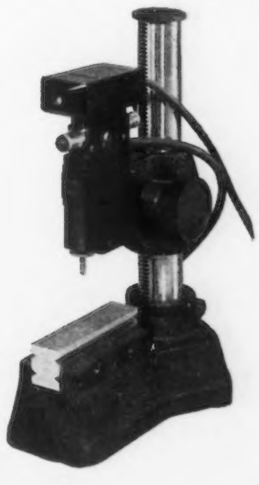
Prepare For INSPECTION



The Sheffield Electrigage has eliminated the bottleneck of slow, tedious dimension checking in many inspection departments because it flashes its answer instantly—just as fast as the work pieces are presented. If the signal light flashes amber the part being gaged is within specified tolerances. Green shows oversize, red undersize.

The accuracy of this gage is .000010" at any tolerance. It can be set for tolerances from .012" to .000050".

The Electrigage is flexible, consisting of a gaging head, light unit and base. The three elements may be used in one assembly for inspection department work or for checking purchased parts on arrival. The gaging head may be mounted on a machine to check parts in the process of manufacture while still on the machine. In such use the light unit may be assembled with the gaging head or with other light units at some location which would permit the control of several machines by one man.



Write for information about the wide use of the Sheffield Electrigage.

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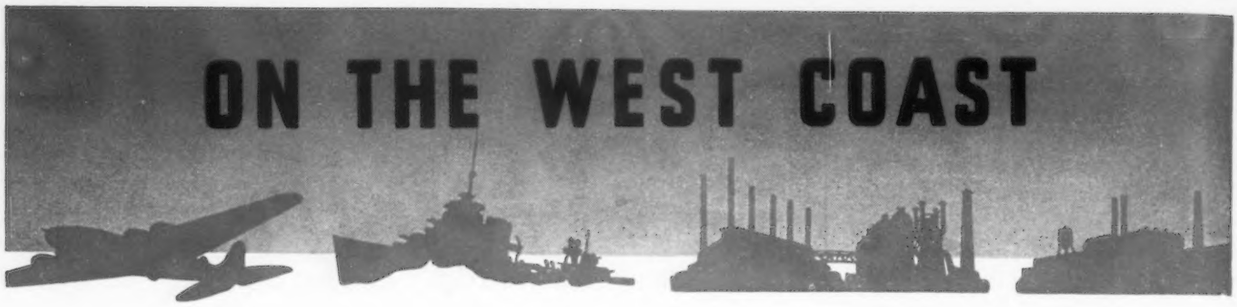


San Francisco

"THE time has come . . . to talk of ships" according to the Walrus as he looks over the general Pacific Coast emergency effort and construction situation immediately following the whirlwind visit of William S. Knudsen, national head of the Office of Production Management. In the Pacific Northwest he personally visited Seattle and Boeing, and shipyards at Tacoma and Portland. Around San Francisco Bay he inspected the shipbuilding operations at Bethlehem, Moore, Western Pipe, Todd-California, Richmond, General Engineering and United Engineering. In southern California he saw the Consolidated Steel, Craig Yards, the big new Consolidated West Basin project and Todd-California at Terminal Island. Among these yards, and apart from navy yards at Bremerton and Mare Island, between the Maritime Commission and the Lend-Lease Ships for Britain, there were already definitely contracted 87 ships on the long range replacement program, C-1, C-2 and C-3, 102 emergency cargo ships and 30 British carriers. Immediately in the wind are huge new contracts pending for the Bethlehem Shipbuilding Corp. at the old Alameda Union plant, to be reconditioned and reopened. In recent years Bethlehem has handled its fabrication and erection projects here, although this was an important ship yard during the last war. Big new contracts are also to be placed at the West Basin yards on Los Angeles harbor at Long Beach, a second project of Consolidated Steel Co.

In general, Mr. Knudsen found that at the steel suppliers and virile, resourceful shipbuilders of the Pacific Coast have been both lucky and effective so far in making the supplies of materials, particularly ship plates, and skilled labor hold out and go around. Except at the Todd-California plant at Richmond, no delays are reported for lack of steel, and this is the newest yard, built out of whole cloth by an organization previously inexperienced and unfamiliar with shipbuilding. According to present indications, manpower may eventually be shorter than plates, for it develops that at least 30,000 additional skilled and semi-skilled workers will be needed for the peak next spring, and there is less definite plan and preparation for supplying this need than the materials.

• Only one delay due to lack of steel reported so far at Coast shipyards . . . Government policy in West turns to expanding existing facilities rather than building new plants.

So far as the Pacific Coast is concerned, the Maritime Commission, the Reconstruction Finance Corp. and the Office of Production Management seem to be inclined to a policy of developing and expanding existing facilities rather than encouraging new plants, at least from now on. Local news announcements of a new $2,000,000 12-ship per year yard in Oakland is regarded as promotion and paper planning and seems not to be seriously encouraged, either by material suppliers or Federal agencies. It is proposed by Walter W. Johnson of Berkeley, president of the former Union Construction Co. which built ships during and after the last World War. It is announced that the West Coast Shipbuilding Co. has been organized with Mr. Johnson as president.

Another promotion proposal which has apparently received little encouragement and made scant progress beyond the paper stage is the Newport Shipbuilding Corp. project at Port Hueneme in Ventura County, up the Coast from Los Angeles and below Santa Barbara. Vincent H. Olson of Long Island, New York, is president, with a 100-acre site available and, so far, unsupported offers provide 40,000,000 tons of new shipping "in the next few years" and to provide 12,000 shipyard workers from the oil fields.

Naval construction authorities have protested during the week that the West Coast master contracts labor agreement calls for a basic wage of $1.25 per hr. for repair and conversion work, and only $1.12 per hr. for new construction by the same worker, and that this constitutes a disadvantageous handicap of 11.6 per cent against contracts for repair on the Pacific Coast. Shipbuilders and operators point out that this is simply equivalent to the old practice of paying nine hours' wages for eight hours' work on old ships, called the "dirty hour." Since, under present conditions, it is impossible for West Coast yards to compete on a price basis with Eastern yards, because of the cost of shipping materials all rail, it is felt that this latest complaint will be ineffective.

During the week arrangements have been made for the Mare Island Navy Yard to incorporate the comparatively nearby facilities and plant of the Yuba Manufacturing Co. at Bonicia, the world's largest manufacturers of placer dredges. The Yuba plant will be operated two and three shifts on reconditioning pumps and winches and for repair of heavy equipment.

Although it has been and will continue to be a tight squeeze, with a lot of give and take shuffling and improvised local allotments, so far no serious material shortages have handicapped military or naval aircraft builders. Aluminum is prob

ably the crucial material and although a present consumption is only 60 per cent of that expected when production reaches a peak, no shortage has yet been felt by the aircraft manufacturers of southern California or by Boeing at Seattle. This is according to an announcement of a nationwide survey of aluminum needs in defense industry by the National Association of Manufacturers.

To further aid in coordinating the complicated priorities assignments on the Pacific Coast, regional offices of the Division of Priorities of OPM are to be established within the next two or three weeks at Los Angeles, San Francisco and Seattle, according to announcements by Frank R. McGregor, regional coordinator of the Priorities Division of the OPM. The Los Angeles office will be in charge of G. Howard Hutchins with W. S. Rosecrans as coordinator for southern California and Arizona according to announcements at a meeting of the Aircraft Parts Manufacturers Association in Los Angeles on Tuesday, July 15. At San Francisco, Andrew Kerr, formerly head of a local stove manufacturers enterprise, will be in charge. Office of Emergency Management Pacific Coast headquarters has been opened in San Francisco under the direction of Dean S. Jennings.

So far no power shortage threatens any point on the Pacific Coast, either electric power, natural gas or petroleum. A major aluminum reduction plant announced last week as located at Tacoma was originally planned for North Carolina but shifted because of the availability of Pacific Northwest power. Other subsidiary and accessory industries are planning continually to take advantage of these available and surplus power supplies.

Under emergency pressures price often becomes secondary, but when and where price is a consideration, as it still sometimes must be, these all-rail shipments have upped long accustomed price schedules and structures on the West Coast into veritable chaos. Every supplier now quotes on an f.o.b. mill basis, and no buyer knows what his West Coast delivered price will be, since uncertainties of supply and delivery cannot depend upon one mill. If he orders wire rods, they may come from the Eastern Seaboard or from Chicago, or possibly from the Birmingham district, and there may be a variation of as much as $15 a ton in freight rate, sometimes aggregating 25 per cent, 33 per cent or even 50 per cent of the f.o.b. mill value of the shipment. Nor can the manufacturer on the Pacific Coast raise his prices in proportion, on his finished product.

Some suppliers are attempting to proportion commercial, non-emergency non-priority shipments among customers in accordance with last year's consumption and this, of course, works hardship on rapidly expanding suppliers to aircraft and shipyard enterprises whose purchases have increased astronomically compared even with last year's records. Even though mills and suppliers of metal raw material are working wide open and bending every energy to keep up, non-priority buyers are subject to additional delays.

1000TH BOMBER: The thousands of workers at the Lockheed aircraft factory at Burbank, Cal., stopped work for a few minutes after completing the 1000th bomber for Great Britain to hear Lord Halifax, British ambassador (top right), say: "I bring the thanks of my people for your skill and craftsmanship."

Fatigue Cracks

BY A.H.DIX

Jeremiah

A member of the brains department is worried about the self-emptying ash receiver for automobiles, mentioned here last week. He sees it as a symbol of decadence. He thinks things are being made too easy for the race and that we are in danger of becoming soft.

The harborer of this fear has no objection to ready-rolled cigarettes, sliced bread, self-starters, coal stokers, paper clips, and the little tab on cigarette packages that enables you to remove the cellophane without using a can opener, but he thinks the self-emptying ash receiver is going Too Far.

In many parts of France the washboard is regarded as one of the devil's inventions. The way to wash clothes is to wring 'em and whack 'em with a paddle. The washboard saves time, but what to do with the time saved? Devil + idle hands = ?

Or if you want to go back a bit you can imagine the looks of disapproval on the faces of the tribe's old men when they saw the inventor of the wheel fixing slabs of tree trunk to the sides of his stone sled, so that his mate could roll the kill back to the cave instead of dragging it. "What," they muttered, "will she do with the time she saves?"

Our own opinion is that the self-emptying ash tray can be accepted fearlessly, for the automobile people are compensating for it amply by making vital parts almost inaccessible, by designing the car so that the driver has so many blind spots he has to drive partially by instrument, and by supplying jacks and jack-space of such a character as to indicate automobile designers look upon a flat as something reprehensible and avoidable, like lice, for instance.

Hurry

I notice in a recent issue a machine tool builder advertises that the "tarry" at each end of the table traverse may be independently adjusted.

In these days of machine tool speedup isn't the word "tarry" psychologically unsound and isn't there a better substitute?

—M. W. A.

For instance?

Curiosa

Jack Cosman, of the brains department, who served his time at his trade in England, says that in Sheffield he was told a common article of export to this country in the previous century was Sheffield water, for use in heat treating. It was believed that the water had valuable properties which were imparted to cutlery and other metal products quenched in it.

Fight

We are caught in the middle of a solar squabble of astronomical proportions between W. H. Rastall, of the U. S. Tariff Commission, and Chester Howard Ober, of your favorite family journal's advertising staff. It began by the former asking:

"Where and when does the sun rise in the north and set in the north?"

We submitted the question to Chet Ober, who used to be with the Coast and Geodetic Survey. As quick as you can say monochlormethylchlorformate, he answered:

"If you started at the North Pole Mar. 21 and traveled at a daily uniform speed, reaching the Arctic Circle on June 22, turned around and reached the North Pole Sept. 23, you would see the sun each day at midnight rising and setting in the north."

He gave us three pages of figures to prove it. As we understand it the sun does not do a full-time rising job, but just pokes its head above the northern horizon, creeps completely around the horizon like a turtle on a tether, and ducks out where it came in.

We sent the whole works to Mr. Rastall, who, instead of being grateful, argues about the calculations:

"Tell Chet it takes more than the word ***isostacy*** to impress me! I have played bridge with Major Bowie too often for that."

Major Bowie is not to be confused with Colonel Bowie, inventor of the bowie knife. We are told that the late Major Bowie, though he may not have invented gravity, at least was on more intimate terms with it than any man since Isaac Newton, and is spoken of in earth-measuring circles in the same hushed tones that Benny Goodman commands in the swing set.

As the discussion is 'way over our head and as we suspect that not more than 25 per cent of the 18 loyal readers of this page can work up a good sweat over the subject, we are going to bow out awkwardly.

Chain Smoker's Friend

• • • Our favorite automobile press agent, Pontiac's, informs us that a new ash receiver empties itself automatically. You fasten it to the ventilating pane, and when you swing the window open, zip go the ashes, butts and burnt matches. You know, of course, that there is also a device that delivers a lighted cigarette to you. Obviously, the next step is an accessory that not only lights the cigarette and dumps the ash, but also smokes the cigarette.

The pleasure of smoking is said to be largely visual anyway, and this will be a boon to drivers who have the desire but lack the will power to cure a cigarette cough. An added advantage is that it will operate efficiently on cigarettes that are kind to the throat and those that are unkind.

Aptronyms

• • • To our names-that-sound-like-the-job department, R. S. (Monitor Controller Co.) Durling contributes Harry Packham of the Maryland Container Co. (packing boxes) and J. D. Swearinger, Pittsburgh notary public.

The other day we saw a motor truck in front of the Grand Central Station marked "AL BUNZ, BAKER."

Puzzles

Last week's psychiatrists' promotion piece unscrambles to this: at Day, 32 units; at Night, 4 units; at Morrow, 64 units.

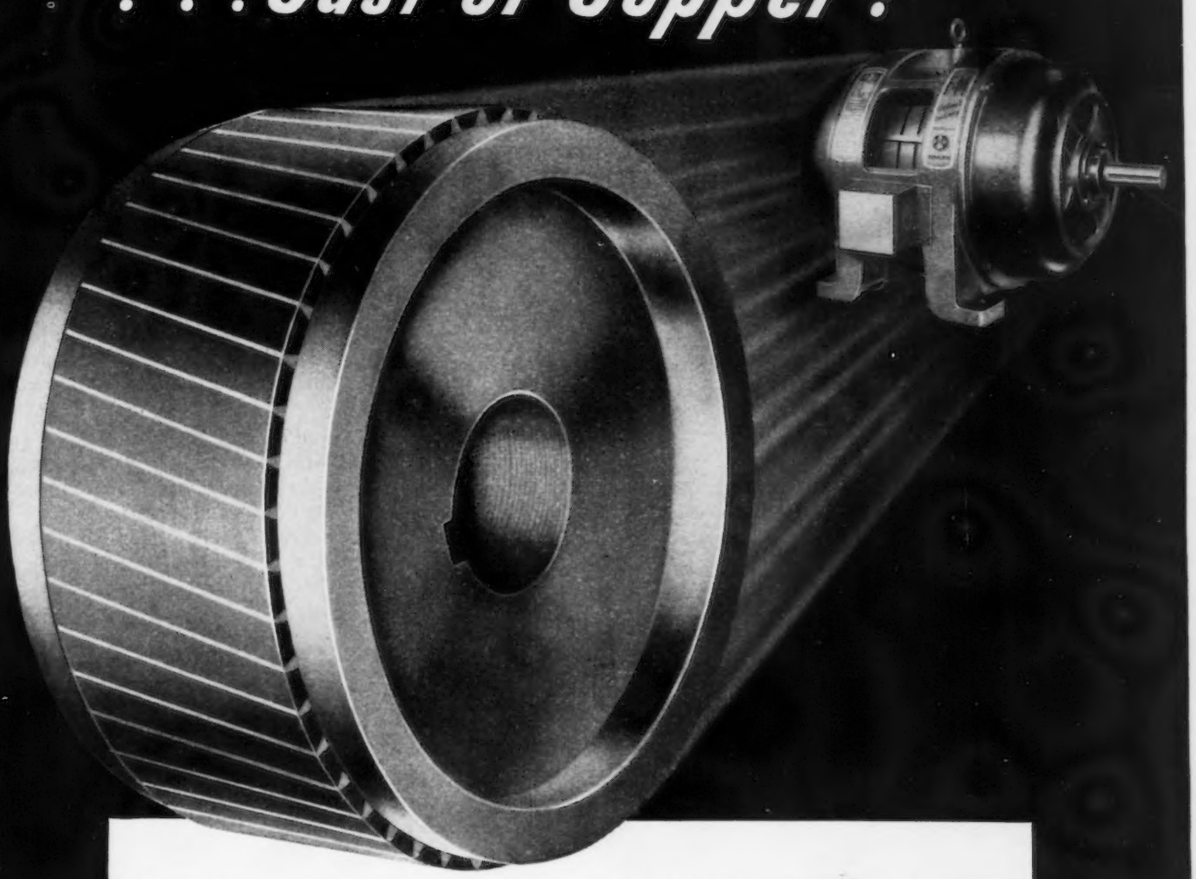
Between them, Lt. Commander A. R. Simpson and Robert M. (Jones & Laughlin) Smith have figured out a whole batch of additional right answers to the problem about expressing one-eighth by using each digit from 1 to 9 just once. Here they are: 9321/74568, 9531/76248, 6741/53928, 5371/42968, 4591/36728, 6741/53928, 5921/47368, 4691/37528, 8942/71536, 9352/74816, 9182/73456, 5892/47136, 7123/56984, 8953/71624, 9523/76184, 8954/71632, 8394/67152, 7894/63152, 9316/74528, 9416/75328, 5916/47328, 5237/41896, 9158/73264, 8419/67352, 8439/67512, 4769/38152, 8179/65432, 6479/51832, 5789/46312, 7421/59368, 7941/63528, 7312/58496, 7123/56984, 7364/58912. Altogether, we have received 34 correct answers, 33 more than are given in our puzzle book.

If you can get this before the ice in your rum Collins melts mark yourself A plus in mathematics:

Arrange the nine digits so that the first three will be one-third of the last three; and the central three equal to the difference between the first three and the last three.

Maybe there are a flock of right answers. We know only one, the one given in our puzzle book.

An INDESTRUCTIBLE Rotor
. . . Cast of Copper !



THIS indestructible, one-piece rotor with windings centrifugally cast of SOLID COPPER is found only in Fairbanks-Morse Motors.

It's a rotor that does more than meet the tempo of today's industrial needs . . . it sets a *new standard* of motor performance. For *only in this rotor* are the advantages of a one-piece winding combined with the advantages of *copper.*

Copper has a high melting point (2000° F.)*, high electrical conductivity, and low thermal expansion. And so F-M Motors, with patented features available only in Copperspun rotors, better withstand constant starting and reversing, give added years of dependable operation, and minimize operating costs.

*Aluminum melts at 1100° F.

Worth your consideration are the advantages in your service of Fairbanks-Morse Motors with Copperspun rotors. Write Fairbanks, Morse & Co., Dept. G-38, 600 South Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.

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News of Industry

Dry Months at Youngstown Cost C-I Equivalent of Steel For 2 Cruisers

Youngstown, Ohio

• • • **How inadequate water** supplies have hampered steel production in this district recently was explained July 15 before a Senate Committee on flood control by a group of Youngstown executives urging construction of the Berlin and Mosquito reservoirs on the Mahoning River.

A. C. Cummins, general superintendent of the Youngstown district property of Carnegie-Illinois Steel Corp., testified that based on production of June, 1941, the average loss of steel production during dry months at Carnegie-Illinois plants would be 4000 tons per month or 28,000 tons per year.

"This loss in production is the equivalent of enough steel to construct two 10,000-ton cruisers for the navy, supply about one million 105-mm anti-aircraft shells for the artillery, or to make three million Garand rifle barrels," said Mr. Cummins.

"The Youngstown property of Carnegie-Illinois had been quite seriously affected both by shortage of water and by the high temperatures prevailing during the past two and a half months," he said. "It has caused material loss in blast furnace production, has caused furnace delays in the open hearth department and has affected production of rolling mills, due to power shortage, reducing roll life and bearing failures. Production has been spoiled on mills where lack of power affected delicate speed adjustments."

J. C. Argetsinger, vice-president and general counsel of Youngstown Sheet & Tube Co., asserted that "not less than 37½ per cent and possibly as much as 50 per cent of the 8,000,000 to 9,000,000 tons of annual steel capacity of the Youngstown district has direct importance in national defense."

Mr. Argetsinger pointed out that steel plants alone between Youngstown and Warren, Ohio, inclusive, require as much as 800,000,000 gal. of water per day. The Mahoning River's flow is used over and over on an average of at least twenty times each day and in some instances as much as forty and fifty times daily. In some cases steel plants use the water several times within one plant before it is returned to the river.

Approximately one billion dollars is invested in steel and steel fabricating plants in the district, said Mr. Argetsinger, pointing out that the two desired reservoirs would assure a daily flow down the Mahoning River of from 200,000,000 to 300,000,000 gal. and that the approximate cost of preserving the district's steel capacity and keeping it producing at its full limit would be only $1.25 per ton.

Roy L. Leventry, district manager of Republic Steel Corp., Youngstown plant, representing both the Warren and Youngstown districts of that company, testified that blast furnaces, open hearths, soaking pits, reheating furnaces and rolling mills with water cooled rolls and bearings are all dependent upon cooling water.

"During hot weather and low flow in the Mahoning River, temperature of the water often reaches 115 deg. F. at the intakes of the Youngstown plant," said Mr. Leventry. During this period delays with resultant loss in tonnage increase on these units.

E. L. Franklin, representing Ohio Public Service Co., testified that if the flow of the Mahoning River could be increased during the dry periods, his plant would be able to operate to its full capacity of 85,000 kw., thereby releasing the 30,000 kw. imported during the dry season for use in other districts and thus adding to the general power supply of the country as a whole. He estimated demand from Copperweld Steel Co. at 30,000 kw., Republic Steel Corp., 30,000 kw., and the new Ravenna Ordnance plant at 6000 kw.

J. L. Mauthe, general superintendent of Youngstown district plants of Youngstown Sheet & Tube Co., estimated that his company used 31,000 gal. of water per ton of steel ingots produced in the month of January, 1941, as opposed to 36,000 gal. of water in the month of June, 1941, citing these figures as another example of the adverse effect on the steel making ability of his company's plants in relation to the water supply and particularly as to the temperature of the water.

War Effort Not Yet Felt In Northwest

Minneapolis, Minn.

• • • **Flags aren't flying** and war drums aren't rolling for either the man in the street or the industrialist in Minnesota.

Business and employment is better than it has been since 1930 due to the defense program, but the full impact of the program hasn't hit here, and undoubtedly it never will to the degree obtained in more industrial states. Major direct defense orders in the entire state can be counted on the fingers of less than two hands.

In Minneapolis, Northern Pump is far and away the largest with Navy orders for gun mounts, towing carriages, gun rammer equipment, submersible portable pumps, etc., approximately $60 million. Next largest orders are for less than $3 million for fire control instruments, sight assemblies, quadrant gunners, etc., held by Minneapolis-Honeywell Regulator Co. Flour City Ornamental Iron Co. has about $2 million in orders for footbridge parts and pontoon equipment. D. W. Onan & Sons have $1½ million contracted for gasoline power generator sets; and Minneapolis-Moline is one of the few large subcontractors, and according to reports, may soon be making shells. Minneapolis' other big contracts are held by Munsingwear Inc. and North Star Woolen Mills Co., for army undershirts, trousers and jackets.

In St. Paul, there are only three sizeable defense contractors — American Hoist & Derrick with about $2 million for locomotive and shipyard cranes, steam winches, etc.; and Seegar Refrigerator Co., who are producing quantities of ice boxes for army camps, and Minnesota Mining & Mfg. Co. who are selling quantities of cellulose tape to practically the entire defense program.

Duluth, third largest city, is the scene of the building of five Great Lakes ships.

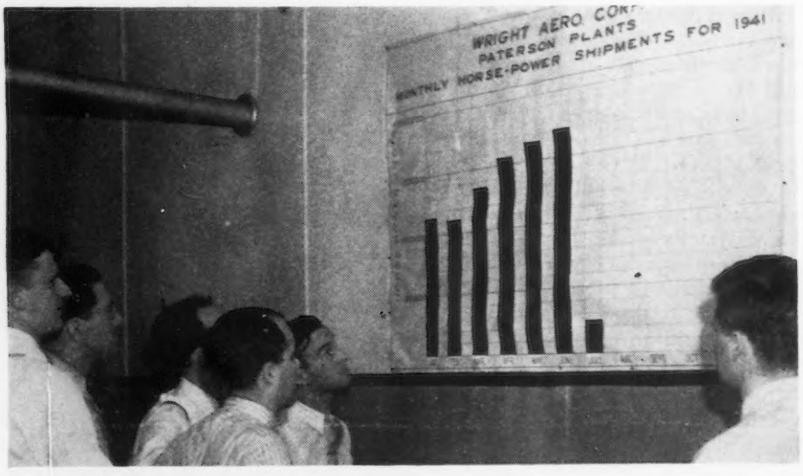
St. Paul will soon have a big contractor in International Harvester Co. with a $12 million contract for small arms. Remodeling of an old plant will be concluded in September.

Biggest contractor of all will be the $30 million small arms twin cities plant to be located in the twin cities area, probably at New Brighton, and to be operated by the Western Cartridge Co. of Minneapolis. The plant will employ about 8500.

All told, there are about $100 million in contracts for the state, with Northern Pump alone accounting for more than half. Among the contracts under $1,000,000 the local Defense Contract Service figures there is a total of only $13½ million, divided among

FIRST PRIVATE factory in the U. S. to make a 105 mm. howitzer, successor to the French 75, is that of the Vilter Mfg. Co., Milwaukee. The gun, with a range of 9000 yards, has a bore of 4.1 in. Top photo shows a machinist honing the inside of the barrel, the center photo another workman is cutting threads on the butt of a howitzer and the lower photo one wing of Vilter refrigerator plant where the howitzer barrels are finished.

Photo by International



WAR CHART: No chart on any wall in any U. S. plant carries more vital information on the swiftness of U. S. arming than the chart shown above. It appears on a wall (in a cafeteria) of the Wright Aeronautical plant at Paterson, N. J., and shows the monthly shipments of airplane engines (in horsepower) from the Wright plant. The lower photo shows some recently-completed Wright motors.

Coming Events

July 23 to 26—Silver Bay Industrial Conference, Silver Bay on Lake George, N. Y.

Sept. 23 to 26—Iron and Steel Engineers, annual convention and exposition, Cleveland.

Sept. 25 to 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee.

Oct. 1 to 4—The Electrochemical Society, Fall Meeting, Chicago.

Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.

Oct. 20 to 24—National Metal Congress, Philadelphia.

THE MEN BEHIND THE SOLDIER: Eighty-five representatives (above) of Midwest companies producing small arms recently attended a small arms conference with the OPM at General Motors Corp.'s Frigidaire plant at Dayton. (Little was said about frigidaires.)

185 firms. Practically all of these 1017 contracts were placed in the past three months, for up until April, defense orders were rare in this area, which includes both the Dakotas, part of Wisconsin and Michigan, as well as Minnesota.

Because of plant facilities and labor supply, this total will not grow proportionately much larger in the future. All metalworking plants are at capacity now, according to H. C. Timberlake, manager of his district's Defense Contract Service. "Capacity" means they are working eight-hour days, five days a week. Timberlake figures that not more than one-fifth of metal plants could take on defense work other than that strictly in line with normal production. On invitations for subcontracting International Harvester work to be done here, only eight firms bid on five different pieces.

These plants are afraid to let go of their normal work for this "war baby" stuff. As one St. Paul manufacturer put it: "We haven't forgotten that day in 1919 when we got the telegram telling us to stop all work, and it took us three years to recover."

As for labor scarcity, it is estimated that right now there are between 500 to 800 capable machinists in the state. Minnesota Employment Security Division figures there are 14,000 unemployed of "skilled" classification. Much more than half belong to the building trades and the rest include many who would never qualify for skilled machine shop work. There are no formal training programs in process, except the usual work of the leading vocational high schools. Last March there were 5846 trainees in approved classes, but that number is not as large now.

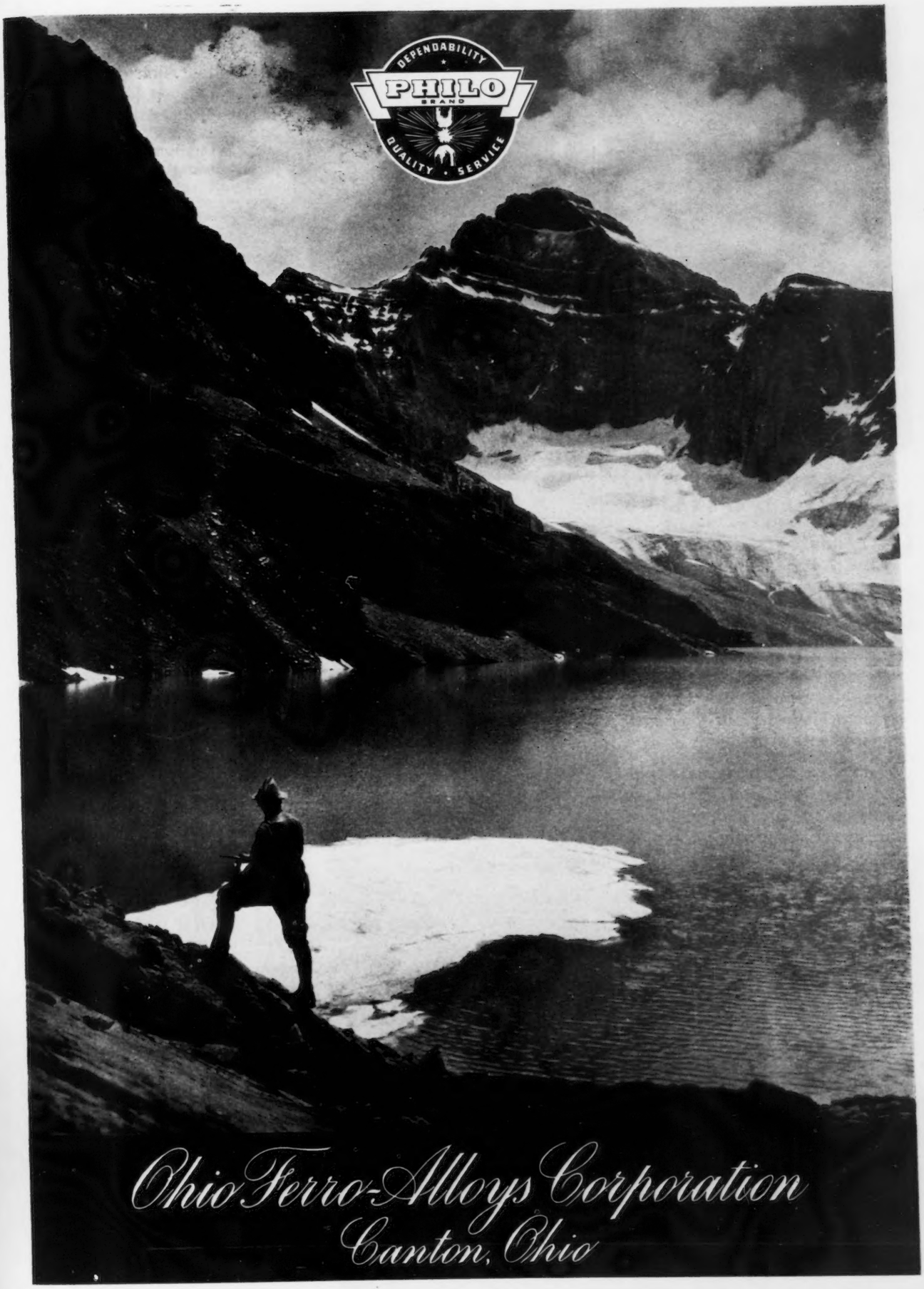
St. Paul's school has 120 in training currently in anticipation of Harvester's needs. Plants are doing their own training and, in general, industry figures that at most semi-skilled help will be needed for the defense work that comes to the state and that farm boys are the best material in the world for quick training in a single, specialized operation. The Harvester plant and the Federal Cartridge plant will both employ a goodly portion of women to do the required work.

Defense Contract Service notes that the apathy toward defense work is disappearing as the pinch is being felt on many materials. More and more volunteers are seeking defense orders now to keep their shops open. June saw more bids entered than in any previous month. Though the Twin Cities are both strongly unionized, the labor record is enviable. There hasn't been a defense strike in 1941.

It cannot be gainsaid that Minnesota is an agricultural state and that its greatest contributions to defense are and will continue to be its food products and its shipments of iron ore. Some industrialists feel the state would be a strategic site for plants producing airplane parts, other than engines. A group of businessmen, organized as the Northwest Research Foundation, are experimenting with Dakota lignite-char production, from which they hope to get cheap hydrogen for ammonia and from there the nitrates and TNT needed in explosives. The state is pushing to get an ammonia plant here since it feels that its defense contribution lies in some such direction.

WAR AT HOME: Defying clouds of tear gas and live bullets fired over their heads, strike pickets, last week paraded outside the plant of Air Associates, Inc., in Bendix, N. J., to tie up the plant. The strike, hampering production of aviation accessories, began over dismissal of nine sheet metal workers.

Photo by International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ARMY CHOW

needs pots and pans and baskets, pails and buckets, etc.

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Cuyahoga Handles are made in any commercial metal, hot-tinned, plated, or finished in color.

We also make all types of round and flat wire springs and wire parts.

THE CUYAHOGA SPRING CO

10280 BEREA ROAD

CLEVELAND, OHIO

National Steel Car's Labor Problem Still Unsettled

Toronto

• • • **Slow progress** is being made in connection with labor problems at the Hamilton plant of National Steel Car Corp., Ltd., with no definite settlement in sight at the present time. The official Board of Conciliation, formed after the recent strike and consequent installation of a Federal Government Controller at the plant, in its majority report on the situation said that it was of the opinion that no finding could be made in respect to the question of hours, wages and working conditions and union recognition now that a Government Controller had been placed in charge of the plant.

Members of the Steel Workers Organizing Committee met to discuss the report and finally appointed a committee to meet the Controller of National Steel Car Corp. The controller stated that he could not recognize a union but, however, he is prepared to meet a committee of the company's employees, whether they were union members or not.

Third Pay Increase At United Aircraft

• • • **For the third time** in seven months United Aircraft Corp. has increased wages at its three divisions, Hamilton Standard Propellers, Pratt & Whitney, and Vought-Sikorsky. These increases now total 12½ to 15c. per hour and add $8,600,000 to the annual payroll. The present wage adjustments range from 5 to 10c. an hour, provide a premium for the second and third shifts and double time for work on Sundays and holidays. Salaried payrolls are being reviewed to make appropriate adjustments.

Copperweld Steel Union Controversy Is Settled

Warren, Ohio

• • • **At the Copperweld** Steel Co. plant here company officials, union heads, and a strikers' committee reached an agreement late July 15 after a short dispute. The agreement provided for return to duty of nine foremen and continued negotiations with six others.

CAR CUT IN HALF: Because there is no gasoline to be had in German-occupied Paris today, some Frenchmen have had their automobiles cut in half, placing a horse where the motor used to be. The driver sits in a dickey seat atop the cab.

Akron Hiring Code Forbids Labor Piracy

Akron, Ohio

• • • **In a move to discourage "labor piracy" and other sudden changing of employment by defense workers, industrial and commercial organizations of this city, in cooperation with the Chamber of Commerce, have established a Defense Hiring Code which forbids hiring away of one plant's employees by another plant.**

The code, which has been subscribed to by plants accounting for 90 per cent of Akron's payroll, contains the following provisions:

1. Employees of other companies shall not be solicited to change to new positions.

2. Every effort shall be made to ascertain if all applicants for positions are employed elsewhere.

3. When an employee leaves one company for another, one week's notice must be given to the original employer unless exception is made with consent of both.

Alloy Manual for Students Issued by Allegheny Ludlum

Pittsburgh

• • • **Two informative manuals** on high-alloy steels, of interest to students and instructors in trade and engineering schools, Army and Navy courses, and industrial defense courses, have been prepared by the Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh, Pa.

One manual covers tool steel while the other treats stainless steel. Data contained in the manuals are sufficiently elemental to give students a clear picture of the analyses, treatment and basic uses of the alloys discussed, but is also inclusive enough to be of value to anyone who works with special steels.

Republic to Enlarge No. 6 Furnace at Gadsden, Ala.

Gadsden, Ala.

• • • **Furnace No.** 2 at the Gulfsteel division of Republic Steel Corp. here, will be enlarged from 90 to 125 tons capacity about next November, or the next time it is taken off for repairs, E. I. Evans, district manager, has announced.

CLOSE TOLERANCES WITH

Thomas Strip

COLD ROLLED STRIP STEEL

THOMAS MILL OPERATIONS are maintained at an unusually high peak of perfection. Prominent among these is slitting, which has proved of vital importance to many customers. The edges of Thomastrip are straight, and the width is accurate throughout the coils, enabling free and unhesitating production through progressive and other types of stamping or forming dies. The original edges of Thomastrip are often utilized in finished products without further touching up during assembly operations. Because of these slitting qualities, Thomas customers reduce their manufacturing costs.

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BRIGHT FINISH UNCOATED AND ELECTRO COATED WITH NICKEL, ZINC, COPPER, BRASS

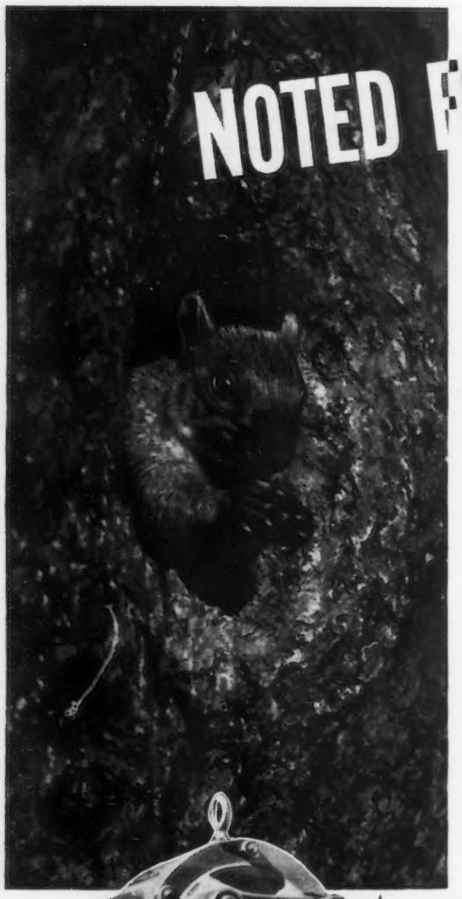
THE THOMAS STEEL CO., WARREN, OHIO

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Government Awards . . .

War Dept., Ordnance:

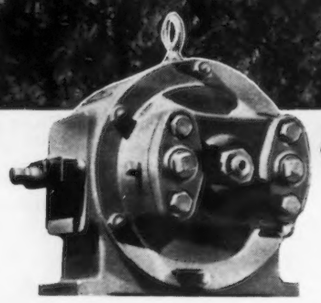
Addressograph - Multigraph Corp., Cleveland; fuze parts $355,500
Allegheny Forging Co., Pittsburgh; steel forgings 4,641
American Locomotive Co., New York; gun carriages 2,138,000
American Steel & Wire Co., Chicago; carbon steel 2,261
Auto Specialties Mfg. Co., St. Joseph, Mich.; shells 595,000
Bendix Aviation Corp., Bendix Marine Division, Brooklyn; transmitters and differentials 908,976
Bethlehem Steel Co., Bethlehem, Pa.; steel plates 11,333
rails, steel 2,622
projectiles 15,442,666
Black & Decker Co., Kent, Ohio; shells 180,000
Broderick Co., Muncie, Ind.; links, track shoe 120,800
Carboloy Co., Inc., Detroit; machine tools 2,954
Chicago Flexible Shaft Co., Chicago; fuzes 901,529
Consolidated Packaging Corp., Buffalo; machine, primer tube assembly 16,250
Continental Can Co., Inc., New York; parts for can packing .. 64,802
C-O-Two Fire Equipment Co., Newark, N. J.; fire extinguishers 4,399
Covel Mfg. Co., Benton Harbor, Mich.; machine, universal 1,630
Crankshaft Machine Co., Jackson, Mich.; lathe, contour turning .. 25,315
Cross Gear & Machine Co., Detroit; rounder 4,540
Crucible Steel Co., Harrison, N. J.; shot 3,150,000
Defiance Pressed Steel Co., Marion, Ohio; cases, cartridge 1,291,408
A. B. Dick Co., Chicago; fuzes .. 234,770
Dole Valve Co., Chicago; shells .. 150,392
John Dunlap Co., Carnegie, Pa.; cases, cartridge 970,000
Ex-Cell-O Corp., Detroit; boring machine 3,418
Falls Screw Products Co., Cuyahoga Falls, Ohio; projectiles .. 196,710
Fellow Machine Co., Detroit; machine, nut slotting 3,277
Gabriel Co., Cleveland; shells ... 610,000
Garden City Plating Co., Chicago; fuzes 139,998
Gallmeyer & Livingston Co., Grand Rapids, Mich.; grinders 64,824
General Motors Corp., Detroit; guns 27,823,008
General Motors Corp., Guide Lamp Division, Anderson, Ind.; cases cartridge 601,000
General Steel Castings Corp., Eddystone, Pa.; gun carriages ... 396,035
Genesee Tool Co., Fenton, Mich.; tools, small 13,253
Globe Machine & Stamping Co., Cleveland; cases, cartridge 44,850
Gold Seal Electric Supply Co., Philadelphia; cable and wire .. 3,111
Great Lakes Steel Corp., Ecorse, Detroit; steel plates 20,854
sheets, steel 1,832
Hartford Electric Steel Corp., Roxbury, Mass.; castings, steel ... 1,624
High Speed Hammer Co., Inc., Rochester; hammers, high speed 1,525
International Harvester Co., Chicago; adapter boosters 128,400
International Register Co., Chicago; shells 1,593,700
Lamson Co., Inc., Syracuse, N. Y.; mounts, tripod 1,243,152
McKiernan-Terry Corp., Dover, N. J.; cutter 4,418
Martin-Parry Corp., York, Pa.; adapters 80,610
Micromatic Hone Corp., Detroit; tools, honing 34,339
Miles Machinery Co., Saginaw, Mich.; borematic 5,400
Modern Tool & Die Co., Philadelphia; gages 14,170
Mossberg & Sons, Inc., C. F., New Haven, Conn.; rifles 33,500
Murray Mfg. Corp., Brooklyn; shells 1,792,000
Neptune Meter Co., Long Island, N. Y.; fuzes 380,000
Northwest Metal Products Co., Inc., Seattle; cartridge clips 777,450
Oliver Instrument Co., Adrian, Mich.; grinders 1,900
Pittsburgh Steel Foundry, Glassport, Pa.; gun carriages 573,730
Poor & Co., Canton Forge & Axle Works Division, Canton, Ohio; drop forgings 17,600
Pullman Standard Car Co., Butler, Pa.; shells 4,650,000
Reliable Tool Co., Irvington, N. J.; tools and fixtures 5,077
Remington Arms Co., Bridgeport; rifles 299,089
percussion elements 177,800
cartridges 2,460,000
N. H. Rhodes, Inc., Hartford; timing mechanisms 7,500
Robinson Mfg. Co., Muncy, Pa.; machines, screening 2,344



NOTED FOR THRIFT

Now that production and power facilities are taxed to capacity, Hele-Shaw Fluid Power operation comes to your aid with two timely benefits.

Hele-Shaw Fluid Power (oil under pressure) for operating rams, plungers and other hydraulic mechanisms—is generated by a Hele-Shaw Pump. The pump can be driven by a low cost constant-speed motor. This saves you money in installation. But the savings of Fluid Power also apply to operation. When the Hele-Shaw pump is at work it draws only enough power from the motor to overcome the resistance it meets. When the pump is idling the only losses are from friction and leakage, and these are small. Hele-Shaw Fluid Power is thrifty power. You will profit from its thrift in lower power costs and more power available for other machines.



NOTE IT FOR THRIFT

THE Hele-Shaw Fluid Power Pump

OTHER A-E-CO PRODUCTS: LO-HED HOISTS, TAYLOR STOKERS, MARINE DECK AUXILIARIES

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Photo by International

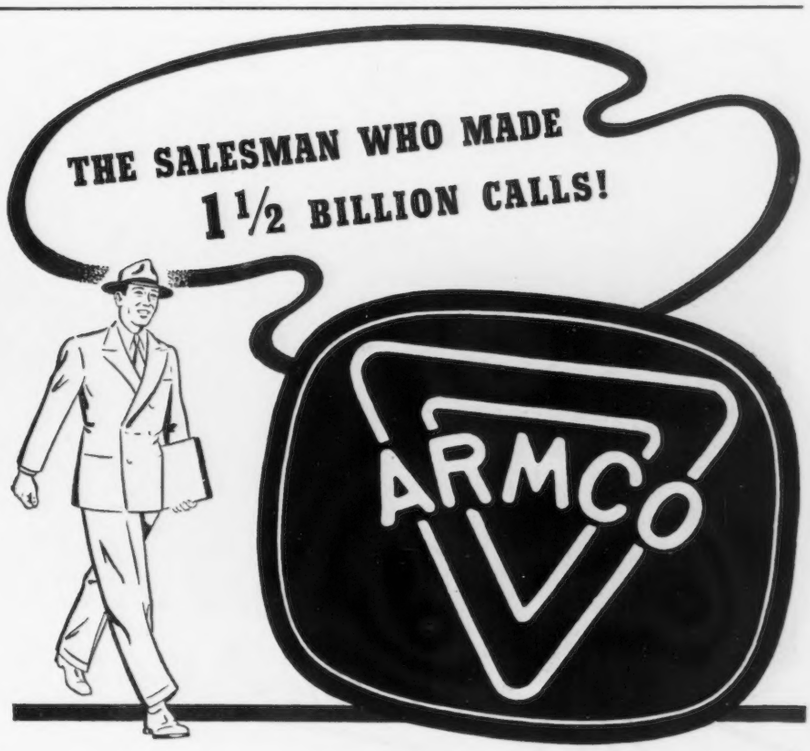
POURING TNT: The Elwood Ordnance plant near Joliet, Ill., largest shell-loading plant in the U. S., is the first of six such plants being built by the Army to go into production (July 12). The photograph shows Lieut. Col. T. C. Gerber, commanding officer, demonstrating how molten TNT is poured into shells. At the center is W. E. Canniff, manager of engineering and operations and (right) Harrison Smith, of Sanderson & Porter, construction engineers.

War Dept. Air Corps:

Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; compasses and inverters	$820,500
Curtiss-Wright Corp., Curtiss Propeller Division, Caldwell, N. J.; propeller assemblies	68,550
General Motors Corp., Allison Division, Indianapolis; engine parts	2,844,116
Glenn L. Martin Co., Baltimore; airplane parts	658,751
United Aircraft Corp., Pratt & Whitney Aircraft Division, East Hartford; aeronautical engines	171,947
Yale & Towne Mfg. Co., Philadelphia; chain hoists	60,862
St. Louis Steel Products Co., St. Louis; arming, wire, assemblies	12,176
W. J. Schoenberger Co., Cleveland; fuze and primers	142,375
Servel, Inc., Evansville, Ind.; cases, cartridge	797,297
Smith & Wesson, Inc., Springfield, Mass.; revolvers	1,170,444
Sonoco Products Co., Garwood, N. J.; spacers, lower, packing	2,419
Standard Tube Co., Detroit; forgings	1,098,000
Stoner Mfg. Co., Aurora, Ill.; cases, cartridge	1,233,750
Tubular Service Corp., Cambridge, Mass.; seamless steel tubing	5,647
Unique Specialties Co., New York; tools and equipment	10,250
John Verduin Machine Corp., Paterson, N. J.; presses, single beam	21,237
Walworth Co., Inc., Harrison, N. J.; pipe and fittings	2,492
Western Cartridge Co., East Alton, Ill.; cartridges	10,083,532
shot guns	32,834

War Dept., Other Agencies:

Albert & Harrison, Inc., New York; ordnance shop, boiler house, railroad spur, and sewers	$73,050
American Cast Iron Pipe Co., Dallas, Texas; water supply line	53,178
American Chain Fence Co., Medford, Mass.; fencing	9,680
American Steel & Wire Co., Ft. Worth, Texas; fencing	7,953
Anchor Products Co., Chicago; needles	51,850
Atlantic Stamping Co., Rochester, N. Y.; milk cans	4,946
J. W. Bailey Construction Co., Seattle; ordnance shop, boiler house and ordnance warehouses	94,600



Incredible? Not for this well known printed symbol of special-quality sheet metals. In the past 26 years, the ARMCO triangle trademark has appeared *1½ billion times* in national and trade magazines. Consumers have been persuaded to look for this mark as assurance of finest basic metal quality in the products they buy.

Hundreds of manufacturers have shown many millions of ARMCO labels on their products in these 26 years. Dealers and consumers recognize ARMCO-identified products and buy with complete confidence.

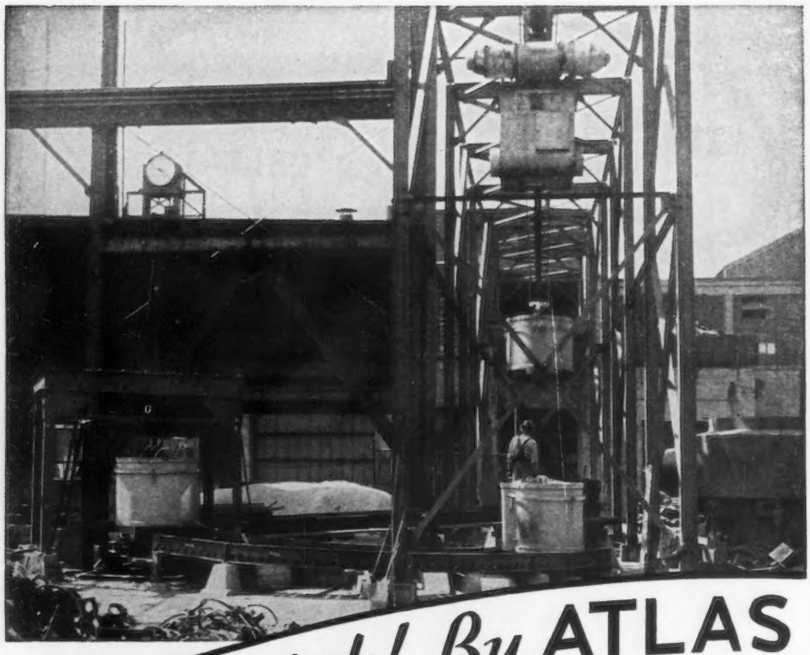
This year the ARMCO triangle trademark will be seen in magazines *more than 100 million times!* Think of the influence this could have on *your* sales.

Consider putting the ARMCO label on every one of your metal products this year. This way you cash in on stored-up sales power. Best of all, it costs you nothing for the services of this able "silent salesman." Ask us about it. The American Rolling Mill Company, 210 Curtis St., Middletown, Ohio.

ARMCO

THE ARMCO LABEL
...26 YEARS OLD

Wm. R. Bootz, Evansville, Ind.:
tanks, air 1,713
tanks, fuel 1,981
Charles D. Briddell, Inc., Crisfield, Md.; cleavers, butchers 3,187
Brockway Motor Co., Inc., Cortland, N. Y.; tractor trucks with semi-trailers 229,200
Brown & Hand Construction Co., Inc., Syracuse, N. Y.; motor repair shops, etc. 99,512
Carilli Construction Co., Dorchester, Mass.; motor repair shops, etc. 85,792
Chicago Bridge & Iron Co., Chicago; construction, 3,000,000-gal. steel water reservoi· 52,510
water tanks 141,900
Chicago Pneumatic Tool Co., St. Louis; compression riveters 29,625
riveting hammers 54,800
Chicago Tool & Kit Mfg. Co., Chicago; pliers and tapes, measuring 1,951
Cincinnati Bickford Tool Co., Cincinnati; radial drills 81,528
Cleveland Pneumatic Tool Co., Cleveland; riveting hammers .. 27,500
Lowell J. Collins Agency, Piedmont, Cal.; dough mixing machine 2,126



An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas-designed, Atlas-built equipment moves heavy scrap and other charging materials with consummate ease.

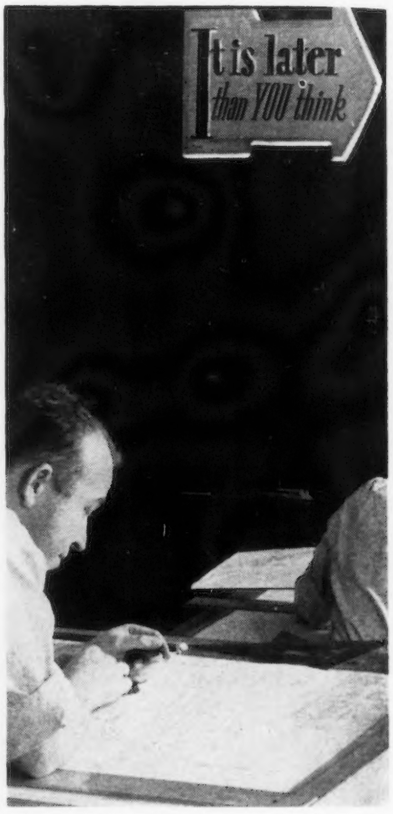
Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers **CLEVELAND, OHIO** ***Manufacturers***

serving the world with mobile handling equipment



MORE SPEED: Not all the pressure for greater production in the defense program falls on production departments. These Westinghouse tool designers and men in drafting rooms through industry likewise know the need for all-out defense effort.

A. L. Coupe Construction Co., Inc., Louisville, Ky.; ice plant 61,750
Doehler Die Casting Co., New York; nozzles, elbow 17,820
Elkington Hellwig Mfg. Co., San Francisco; dishwashers 6,030
Enterprise Mfg. Co. of Pa., Philadelphia; choppers, meat and food 8,147
Fruehauf Trailer & Equipment Co., Seattle, Wash.; multi-wheel trailers 4,830
Fargo Motor Corp., Detroit; tractor trucks, 1½-ton 81,073
Ford Motor Co., Dearborn, Mich.: 1½-ton trucks 1,169,598
Fruehauf Trailer Co., Detroit; parts for semi-trailers 18,059
Gaw Construction Co., Philadelphia; construction, engine repair building 445,706
R. W. Geldart & Co., Inc., New York; pins, safety 7,575
General Motors Corp., Chevrolet Division, Detroit; sedans and ½-ton trucks 78,124
tractor trucks 31,533
Goodell Pratt Co., Greenfield, Mass.; braces, ratchet 1,911
Gray & Dudley Co., Nashville, Tenn.; kettles, camp 26,460
Graybar Electric Co., Inc., San Francisco; wire and cable 5,360
M. Greenberg's Sons, San Francisco; fire hydrants 3,024
Henry H. Hackett, Rapid City, S. D.; fencing 6,383

Hagstrom Construction Co., St. Paul, Minn.; fence 4,975
Halliday Machinery Co., Seattle, Wash.; threading machines 2,345
Fred Haslam & Co., Inc., Brooklyn; forceps 7,550
Hospital Supply Co. and Watters Laboratories, Consolidated, New York; disinfectors 2,445
E. R. Huddy & Sons, Inc., Trenton, N. J.; smoke stack fastenings 10,760
Hussmann-Ligonier Co., Everett, Wash.; mechanical refrigerators 3,850
Independent Pneumatic Tool Co., Chicago; compression riveters .. 197,150
International Harvester Co., Chicago; dump trucks 26,920
trucks 286,800
spare parts 7,999
trucks, 2½-ton 698,048
Johns-Manville Sales Corp., Dallas, Texas; water supply line .. 57,767
Kawneer Co., Niles, Mich.; cradles, cookpot 6,094
Kny-Scheerer Corp., Long Island City, N. Y.; forceps 12,765
scissors 35,170
A. Kreamer, Inc., Brooklyn; measures, liquid, and pans 2,497
Wm. Langbein & Brothers, Brooklyn; forceps and needle holders. 38,100
Lawrence Construction Co., Sacramento, Cal.; construction, air corps hangar and control tower 90,740
Legion Utensils Corp., Long Island City, N. Y.; pots and pans 16,591
Linn Corp., Oneonta, N. Y.; trucks, 2½-ton 61,228
Mack Mfg. Co., Allentown, Pa.; tractor trucks with semi-trailers 231,150
James P. Marsh Corp., Chicago; gauges, air pressure 4,630
William O. McKay Co., Seattle; pickup and dump body trucks .. 8,331
Milcor Steel Co., Milwaukee; boxes, tool 6,235
Morrison Supply Co., Wichita Falls, Texas; water supply line 2,285
John Mowat, San Francisco; electric refrigerators 7,807
Northern Commercial Co., Seattle; accessories, tools, equipment .. 2,199
Northern Motor Co., Sacramento, Cal.; automobiles 1,736
Oneida, Ltd., Oneida, N. Y.; forceps 26,997
Peck Stow & Wilcox Co., Southington, Conn.; knives, drawing. 1,876
Penn Surgical Mfg. Co., Inc., Philadelphia; chisels and curettes 27,130
George P. Pilling & Son Co., Philadelphia; forceps, bone cutting, and tongs, skull 30,515
Pittsburgh-Des Moines Steel Co., Chicago; water tank 36,200
water storage standpipe 34,900
Plowden & Roberts Co., Columbia, S. C.; fence 10,386
Polar Ware Co., Sheboygan, Wis.; ladles, pans, pitchers, buckets and trays 60,467
Power Equipment Co., Portland, Ore.; pumping units 2,752
Presto Gas Mfg. Co., Chicago; parts for range, field 30,070
Protectoseal Co. of America, Inc., Chicago; cans, safety, steel 7,347
Pyrene Mfg. Co., Newark; chains and tighteners 13,440
Rose Construction Co., Abilene, Texas; motor repair shops, etc.. 61,000
Savory, Inc., Newark, scoops, flour 2,360
Seattle Bronze Co., Inc., Seattle, Wash.; miscellaneous metal ... 4,588
nails 2,093
H. W. Schultes, Brooklyn; forceps 2,408
Sichel Bakery Equipment Co., San Francisco; oven and dough mixing machine 4,390
J. Sklar Mfg. Co., Long Island City, N. Y.; curettes 2,702
forceps 98,955
D. B. Smith & Co., Inc., Utica; water tanks and equipment ... 2,676
Southeastern Construction Co., Charlotte, N. C.; portable steel igloo magazines 22,834
Stanley Tools, New Britain, Conn.; planes, iron, jack 1,785
planes, iron, smooth 1,610
Storz Instrument Co., St. Louis, Mo.; forceps 4,400
Structural Steel & Forge Co., Salt Lake City, Utah; bomb rests .. 3,369
James T. Taylor, Ft. Worth, Texas; ordnance shop 75,496
Taylor Metal Products Co., Mansfield, Ohio; grates, woodburning 3,927
George Tiemann & Co., New York; forceps 6,200
Torsion Balance Co., New York; scales, prescription 12,750
Trewhitt-Shields & Fisher, Fresno, Cal.; construction, air corps hangar and control tower 101,388
Ford J. Twaits Co. and Morrison-Knudsen Co., Inc., Los Angeles; fire hydrants 6,200
Union Broach Co., Inc., New York; pliers, pots 5,187
Union Dental Instrument Mfg. Corp., Philadelphia; elevators, excavators, forceps, lancets, pluggers, and spatulas 30,901
United States Catheter & Instrument Corp., Glen Falls, N. Y.; bougies, catheters and filiforms 15,301

For Help with Defense Work— Call

WYANDOTTE

Wyandotte Products are being used for the following problems:

1. Electrolytic or spray cleaning of *aluminum* alloy *castings* on high-speed production basis after machining and prior to *anodizing.*

2. Electrolytic cleaning of steel after machining prior to *hard chrome* and *cadmium.*

3. Power washer cleaning of *airplane motors* prior to and after assembling.

4. Tank cleaning of *brass shell cases* during the numerous operations of *drawing, tapering* and *annealing.*

5. Power washer cleaning of *machine gun parts* prior to finishing.

6. Power washer cleaning of *steel shells.*

7. Power washer cleaning of *screw machine aluminum and brass munition parts.*

8. Power washer cleaning *manganese steel helmets* prior to painting.

PHONE OR WIRE
THE J. B. FORD SALES COMPANY
K I—Wyandotte, Michigan

Wyandotte PRODUCTS

Service Representatives in 88 cities

THE J. B. FORD SALES COMPANY, WYANDOTTE, MICHIGAN

United States Pipe & Foundry Co., San Francisco; pipe and water material 6,399

Yellow Truck & Coach Mfg. Co., York, Pa.; trucks, van 678,480

Defense Plant Building:

Anniston Ordnance Depot, Talladega, Ala.; expansion of ammunition storage facilities $2,109,640

Ford Motor Co., Ypsilanti, Mich.; plant and equipment for mfr. of aircraft and aircraft sub-assys.. 47,620,171

Hughes Tool Co., Houston, Tex.; plant and equipment for mfr. of landing gear struts 3,725,001

Kankakee Ordnance Works, Joliet, Ill.; lead azide plant 32,079,967

Maumelle Ordnance Works, Marche, Ark.; plant and equipment $9,991,860

Morgantown Ordnance Works, Morgantown, W. Va.; anhydrous ammonia plant 15,848,000

St. Louis Ordnance Plant, St. Louis; small arms ammunition plant, estimated cost 59,199,559

Seneca Ordnance Depot, Kendaia, N. Y.; ammunition storage depot 6,658,454

N. A. Woodworth Co., Ferndale, Mich.; plant and equipment for mfr. of aircraft engine parts .. 976,344

Sperry Gyroscope Co., North Hempstead, N. Y.; plant and equipment for mfr. of navigation, communication and fire control equipment 20,281,000

Aluminum Program Puts Burden On Acid Fluorspar Producers

• • • **The vast expansion** of aluminum output, projected last week by OPM at Washington, will put a heavy load on producers of acid fluorspar. This type of spar is used in making synthetic cryolite which is used in the reduction of bauxite. With sharply increased mining facilities and more acid making equipment, it is believed that between the United States and Newfoundland, the increased demand can be met, although it will be several times greater than ever before.

Natural cryolite is mined only in Greenland. The United States imported around 25,000 tons in 1940. However synthetic cryolite is much cheaper and hence in great demand for bauxite reduction.

Under OPM's plans, an alumina plant, to be owned by the government, has been recommended to the War Department. Both high grade and low grade bauxite ores would be treated in it.

Thompson Graduates First Defense Class of Learners

Cleveland

• • • **The first "defense class"** of apprentices trained at the plants of the Thompson Products, Inc., here, were graduated recently in a ceremony in which the graduates pledged their unreserved and full cooperation toward aiding the national defense program. Fred C. Crawford, speaking at the ceremonies, declared that the most urgent need of this nation today was men with the "know how," trained manpower, such as represented by the graduates. The company has published an attractive booklet commemorating the occasion.

Sandmaier, of Republic, Joins Weinberg Staff of OPM

Washington

• • • **Philip J. Sandmaier** of the Republic Steel Corp., Cleveland, has been appointed to the staff of Sidney J. Weinberg, chief of the OPM Bureau of Clearance of Industry Advisory Committees.

SPEED CASE STEEL

A LOW CARBON OPEN HEARTH PRODUCT

Assures You . . .

1. UNUSUAL DUCTILITY
Speed Case can be riveted, peened, flared, bent or cold worked similar to other low carbon open hearth steels such as SAE X1020-X1314-15.

2. SMALLER INVENTORY
Due to Versatility of Speed Case

3. INCREASED PRODUCTION
40% to 80% Over SAE X1020-X1314, etc.

4. MACHINABILITY
Machines as fast as SAE X1112

5. CARBURIZING
Carburizes like SAE X1020

6. PHYSICAL PROPERTIES
Equal to SAE X1020-X1315-1115

JOBBERS NOTE!
Reduce Your Inventory
SPEED CASE
the ALL PURPOSE Steel
will allow you to reduce the number of different steels you are now carrying in your stock.
ASK US FOR DETAILS

Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

Licensor
MONARCH STEEL COMPANY
HAMMOND • INDIANAPOLIS • CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Use of Silver Urged To Save War Metals

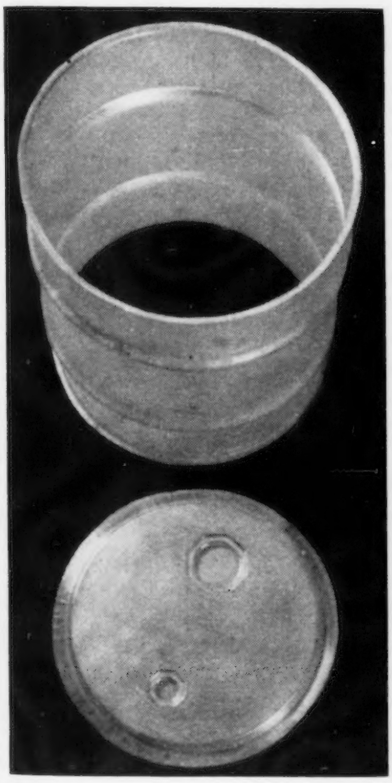
• • • **Use of electroplated silver** coatings for containers or other applications where corrosion resistance or high reflectivity is desired, and the use of silver-lead solders in place of tin-lead solders are suggested as possible means of conserving supplies of such strategic defense metals as tin, aluminum, nickel and chromium in a progress report issued by the American Silver Producers' Research Project.

The field of electroplated coatings continues to show promise, the report says, and the research project's pilot plating plant has been kept busy recently plating drums, pails and cans. At the present time one large can manufacturer is cooperating with the project and a chemical supply house in the development of a silver-lined can for packaging chemicals.

Containers with a silver plated coating also have been packed with different commodities and some experimental units have been put into service. The results reported so far have varied and at the present time it has not been determined why containers, in some cases, have been quite satisfactory and in others, products have been contaminated.

One of the criticisms of silver lined containers appears to be that they do not give sufficiently superior advantages over those now in use to warrant the additional cost, the report states. For the general run of containers this at present is undoubtedly the case, it adds, but it is not true for pack-

SILVER LINING: Typical of efforts to conserve tin and other strategic materials by substitution of silver is this silver-lined experimental drum. Silvercoating, approximately 0.001 in. thick, was applied by electroplating. The drum has a capacity of 15 gal. Wider use of silver for such applications is predicted in recent progress report of American Silver Producers' Research Project.



TRADE AUTOMATIC MARK

Manufacturers for Over Thirty Years

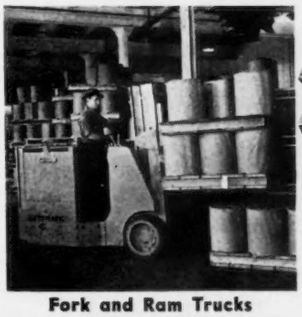
MODERN
Electric Propelled INDUSTRIAL TRUCKS

FOR ECONOMICAL MATERIALS HANDLING

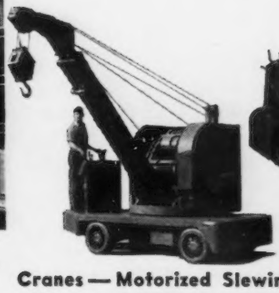
- FORK AND RAM TRUCKS
- LOW AND HIGH LIFT TRUCKS
- COIL AND SHEET HANDLERS
- LOAD CARRIERS
- TRACTORS — CRANES

Capacities 1000 to 60,000 lbs.

Low Lift Skid Platform Type



Fork and Ram Trucks
Telescopic and Non-Telescopic for Pallet and Coil Handling



Cranes — Motorized Slewing Type—Four Motor Control for Individual and Simultaneous Operation

High Lift Skid Platform Type

Light Duty Fork Trucks

Die Handlers Heavy Duty Type with motorized die and unloading platform

Coil and Sheet Handlers

REQUEST DETAILS AND LITERATURE

Listed Under Reexamination Service of UNDERWRITERS' LABORATORIES

AUTOMATIC TRANSPORTATION CO.
75 W. 87th St. Div. of the Yale & Towne Mfg. Co. CHICAGO, ILL.

Major benefits resulted when this lumber yard made the simple, practical hoist installation shown. The problem was moving cut lengths and mill lengths into and out of second story storage. At first, an ordinary hoist and chain sling was considered to replace former hand method. But it was feared stock damage and danger from poorly balanced loads would increase.

This device eliminated those factors and still met requirements. Fewer men were needed and stock reached customers faster and in better condition than ever before.

Because low cost, *tailored*, installations like this are a specialty of ours, we would enjoy suggesting answers to some of *your* materials handling problems.

READING CHAIN & BLOCK CORP.
DEPT. 28 READING, PA.

READING
Chain Hoists, Electric Hoists, Cranes and Monorails

aging some specialized products. In some instances silver lined containers are being seriously considered and tested for packaging corrosive materials because the corrosion resistance of other metals and lacquers is not adequate.

In places where sheet or foil aluminum has been used, for its corrosion resistance or high reflectivity, it is apparent that silver plating on available metals can be substituted.

Silver electro-deposits are being investigated as a substitute for nickel and as an undercoating for chrome plating. A series of experiments are under way to determine what advantages may be derived from the use of a corrosion-resistant electroplate of silver followed by a hard, wear-resistant chromium deposit.

The research project has also conducted experiments to determine the strength of extruded tubing made from a 3.5 per cent silver—96.5 per cent tin alloy. A bursting strength of 2500 lb. per sq. in., or almost double that of pure tin, was reported obtained and this is apparently far in excess of any working pressure encountered in distilled water lines where this material is finding commercial use. Tests on threaded joints showed that the alloy had a tensile strength 25 per cent greater than joints made with pure tin tubing. For certain installations, it is claimed, it would seem feasible to use threaded connections in distilled water lines if the tubing were made of the silver-tin alloy.

Interest continues in the possibilities of using lead-silver solders in place of the standard lead-tin alloys in automatic can making machines. Many of the larger can manufacturers are carrying on experiments with these alloys to obtain data on operating conditions and service tests.

Activities of the research project are carried on in the laboratories of Handy & Harman, 82 Fulton Street, New York.

↓ ↓

OPM Suggests Using Silver Solders

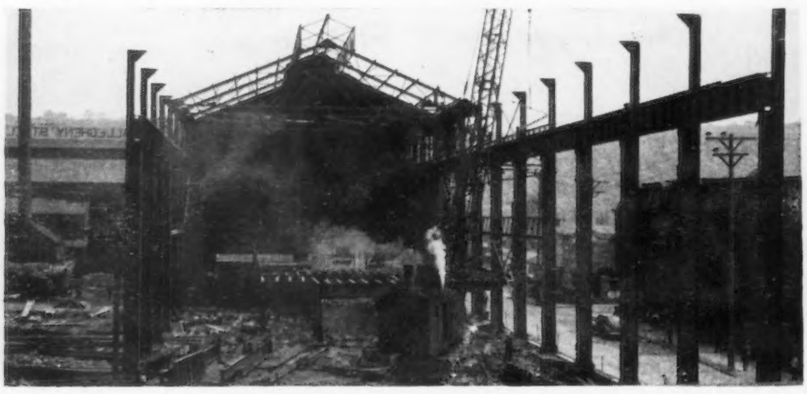
Washington

• • • **Silver may be substituted** extensively for tin in solder to conserve tin and hasten accumulation of adequate reserves of tin, a committee of the National Academy of Sciences has advised the Office of Production Management.

This suggestion topped a list of measures recommended by the committee as a means to bring about further conservation and substitution of tin, in actual emergency, or in order to facilitate the accumulation of an adequate stock pile.

Sixty-six million ounces of silver annually should be sufficient for "all out" replacement of tin in solder, the group said. Forty to 50 lb. of tin may be replaced by 2½ to 5 lb. of silver, it added, and at present prices for tin and for industrial silver the raw material cost of 2½ per cent silver solder is practically identical with that of an equal volume of solder composed of 45 per cent tin and 55 per cent lead.

A HUNDRED DAYS: Ground for this Allegheny Ludlum Steel Corp. addition at Brackenridge, Pa., was broken March 22, 1941. One hundred days later, on July 1, the first of two electric furnaces was installed and in actual operation although the building itself was incomplete. The expansion will increase Allegheny Ludlum production of special steels by 50,000 tons annually.



PAYDAY: Edward R. Stettinius, OPM Priorities Director, is shown handing out paychecks to some of the dollar-a-year members of the Priorities Division executive staff. Left to right are R. J. Lynch, Joseph Overlock, Dexter Kimball, Mr. Stettinius, James O'Neill, Arthur Whiteside, Blackwell Smith and Dr. Harry Rogers.

Record Shows Most Steel Elections Favor SWOC

(Vote results for first six months of 1941)

Name of Company	For SWOC	AFL IND.	For Neither
Monticello Mfg., Elwood, Ind.	9	54	1
Connors Steel, Birmingham	161	..	52
Southern Cement, Birmingham	99	..	14
Southern Wheel Fdry., Portsmouth, Va.	22	..	30
Wackman Welded Ware, Chester, Pa.	37	..	6
Pacific Iron & Steel, Los Angeles	92	49	1
American Can, Detroit	6	..	0
Standard Specialty & Tube Co., New Brighton, Pa.	30	..	11
Evans Product Co., Detroit	116	68	..
Flagg & Co., Stowe, Pa.	316	..	12
Henry Furnace & Foundry Co., Medina, Ohio	42	43	1
Koch Butchers Supply Co., N. Kansas City	74	52	4
Carpenter Steel, Kenilworth, N. J.	82	6	27
*Vernon Tool Co., Vernon, Cal.	41	58	..
Wallingford Steel Co., Wallingford, Conn.	109	135	6
Evans Product Co., Brighton, Mich.	2	35	..
Bass Fdry. & Machine, Fort Wayne, Ind.	166	..	56
†Standard Brake Shoe & Foundry, Memphis, Tenn.	0	3	..
Standard Brake Shoe & Foundry, Memphis, Tenn.	69	19	..
Colorado Fuel & Iron, Pueblo, Col.	1,783	319	2,670
Brown-Manley Plow Co., Malta, Ohio	55	..	21
Basca Mfg. Co., Indianapolis	94	..	34
Cohen & Co., Chelsea, Mass.	43	21	9
General Lamp Cord., Muncie, Ind.	88	..	14
Whitehead & Kales Co., River Rouge, Mich.	333	..	156
Warman Steel Casting Co., Vernon, Cal.	74	64	..
Standard Steel Division of Baldwin Locomotives, Burnham, Pa.	1,073	..	630
Oiljack Mfg. Co., Monticello, N. J.	111	..	37
Alliance Machine Co., Alliance, Ohio	200	..	120
Continental Roll & Steel Fdry., East Chicago, Ind.	526	558	23
American Wire Fabrics Corp., Blue Island, Ill.	65	..	1
Bethlehem Steel, Lackawanna, N. Y.	8,223	..	2,961
Youngstown Steel Door Co., Youngstown, Ohio	331	30	113
John A. Roebling's Sons Co., Trenton and Roebling N. J.	2,912	..	1,477
‡Elliott Mfg. Co., Jeannette, Pa.	76	..	13
Osgood Co., Marion, Ohio	75	137	2

*Run-off Election.
†Craft Election.
‡Office Workers Only.

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MADE POSSIBLE BY
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FIRELESS LOCOMOTIVES

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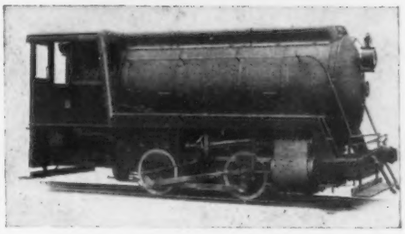
- Saving of 65% in hauling ingots — (Tube Mill)
- Saving of $12.94 per day in hauling lumber — (Lumber Company)



The above figures are from actual statements by Porter customers.

LOW INITIAL COST because no diesel or electric motors are necessary . . . LOW OPERATING COST because steam produced in stationary boilers is used for fuel . . . LOW MAINTENANCE COST because there are few wearing parts . . . all of these are reasons why a Porter Fireless can do the job for less wherever steam pressure is available.

Only Porter builds a complete line of locomotives for industry: Diesel—Diesel Electric — Steam — Fireless Steam — Gasoline — Electric

H. K. PORTER COMPANY, INC.
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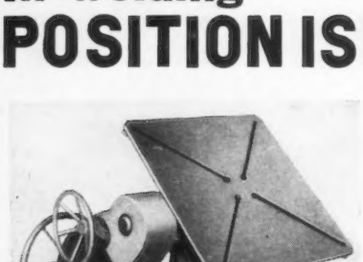
POSITION IS EVERYTHING



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Electrical Industrial Truck Bookings Down in June

• • • **Unit domestic bookings** of electric industrial trucks and tractors during the month of June were below those for April and May, figures just released by the Industrial Truck Statistical Association, 208 South LaSalle Street, Chicago, indicate. June bookings totaled 287 units as compared with 320 units in May.

Total net value of chassis only was $948,005 during June compared with $1,234,936.35 during May.

Details concerning June bookings follow: Twenty-six non-elevating platform trucks with capacities and base chasses prices ranging from 2000 lb. to 6000 lb. and $1,730 to $2,190 respectively had a total net value of $51,800. Net values are at factories, after additions and deductions for variations from standard specifications, trade in allowances, etc., when applicable. There were 216 Cantilever trucks with capacities and prices ranging from 1000 lb. to 20,000 lb. and $2,085 to $7,765 respectively with a total net value of $770,135; thirty-two light and heavy duty tractors, base chasses prices ranging from $1,250 to $2,025, totaling $50,360; thirteen crane trucks with capacities and base chasses prices ranging from 3000 lb. at 7 ft. to 6000 lb. at 7 ft. radii and $5,280 to $6,340 respectively, with a total net value of $75,710. No cancellations were reported during the month of June.

NLRB Upholds AFL after Battles in Cleveland Plant

Cleveland

• • • **After pitched battles** in which flying pieces of steel injured at least 20 combatants here last week, CIO organizers lost a round in their jurisdictional war with the AFL when the National Labor Relations Board upheld an AFL closed shop pact at Paterson-Leitch Co., steel warehouse. The plant, supplying steel for the new Ravenna arsenal, closed last Wednesday for a few days when 200 AFL men cleared the shop of CIO workers by attacking them with steel bars and othes pieces of warehouse stock.

Sorensen, Wibel Become Vice-Presidents of Ford

Detroit

• • • **Election of** Charles E. Sorensen and A. M. Wibel as vice-presidents and directors of the Ford Motor Co. was announced last week by Edsel Ford, president. At the same time Mr. Ford announced that P. E. Martin had resigned as vice-president of the company and planned to take a year's leave of absence to recuperate from a recent illness.

Both Sorensen and Wibel, as top-flight Ford executives, have worked closely with Henry Ford and Edsel Ford for many years. They have come increasingly into public notice in recent months because of their work on the rapidly expanding program of defense production being carried out by the company.

Martin and Sorensen were two of the earliest associates of Henry Ford, Martin having gone to work for Ford as a machinist and assembler in 1903, the year the company was incorporated, and Sorensen beginning his career a year later as a pattern maker. They are widely known in the automotive industry as outstanding production executives.

Wibel has been with the company since 1912, and for the last 14 years has been its director of purchasing. He has taken a leading part in handling the business details of the millions of dollars in defense contracts on which the company is working.

Henry and Edsel Ford expressed regret over the temporary withdrawal of the man who has been associated with them for so many years. "We hope," said Henry Ford, "that the rest will be of benefit to Ed, and that he will be back in a few months, again taking a full part in the direction of the business he has helped to build."

Gun Output in U. S. Reaches 1500 a Day

Washington

• • • **Rifles and sub-machine guns** are now being produced at a rate of more than 1500 per day, it has been announced by the OPM Production Division. This compares with daily average production in August, 1940, of 289 and in January, 1941, of 931. Included in these figures are the Garand semi-automatic rifle, the automatic Browning, and the Thompson sub-machine gun.

5 Certified Strikes Still Not Settled

Washington

• • • Latest report of the activities of the National Defense Mediation Board shows five strikes certified to it as still not settled. The unsettled strikes are: Marlin-Rockwell Corp. (involving 1225 men); Duquesne Light Co. (312 men); Sealed Power Corp. (1163 men); Western Cartridge Co. (4500 men), and Scullin Steel Co. (2200 men).

During the week of July 7 to 13 the board reports settling one strike, arranging postponement of a threatened strike making recommendations in a third case and sending a special representative to investigate a fourth strike. The strike settled in the week involved Cheney Bros., South Manchester, Conn., and the Textile Workers of America (CIO).

New Magnesium Foundry Opened at Indianapolis

Indianapolis

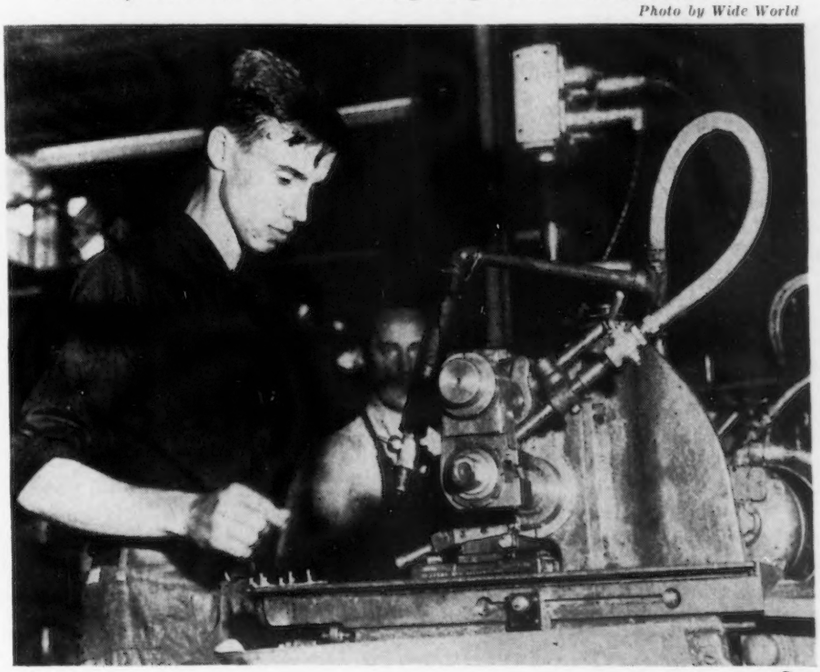
• • • **Light Metals, Inc.,** has put into operation here a new magnesium foundry capable of producing approximately 20,000 lb. of finished castings a month, according to Dr. F. R. Hensel, metallurgical consultant of the company. The company is a licensee of Dow Metal Co. and will produce castings in accordance with ASTM and Army and Navy specifications. The new plant includes a foundry building, pattern shop and contains the latest types of sand handling, core making, heat treating and cleaning equipment.

Dravo Building 10 Freight Car Floats, 15 Oil Barges

• • • **Dravo Corp. has** been awarded 10 freight car floats by the Pennsylvania Railroad. The floats, which are approximately 250 ft. long, will require about 4400 tons of steel. Dravo is also constructing 15 oil barges 195 ft. long, holding about 10,000 gal., to be used in transporting oil from Texas to Pittsburgh terminals.

ARMORER PATTERSON: Robert P. Patterson, Jr., son of the Undersecretary of War, is shown operating a milling machine at the Springfield (Mass.) Armory where he had been working incognito for several weeks.

Photo by Wide World



Blast Furnace Rises From "Scrap Pile"

Pittsburgh

• • • **The reclamation of a blast** furnace which had not operated for 12 years, virtually from the scrap pile, and the possibility of the transportation of three other blast furnaces from the Eastern part of the United States to the West Coast where they will become part of an expansion program, are recent examples of steel industry ingenuity in utilizing to the fullest extent existing equipment for increasing and expediting iron and steel production.

The Hanna Furnace Corp., Buffalo subsidiary of National Steel Corp., started reconstruction work last year and completed within six months rehabilitation on its oldest blast furnace unit which had previously been slated for the scrap pile. A new installation would have taken about one year. At the same time, Hanna Furnace acquired a 3000-hp. boiler plant from an abandoned works of another steel company, which was dismantled, transported, reconditioned, and installed in a new boiler house in record time. As a result of this program, these two large installations of equipment which were reclaimed virtually from the scrap pile are now modern facilities which add 160,000 net tons of pig iron to the total annual production of Hanna's Buffalo plant.

Hanna Furnace Co.'s plant at Buffalo appears in the photograph at the top of this page.

Another outstanding example of utilizing existing equipment and thus saving time, may be found when and if the Columbia Steel expansion takes place at Provo, Utah. At least three older blast furnace units of U. S. Steel Corp. will be moved to that location, one to come from Edgar Thomson works, Braddock, Pa., and two from the American Steel & Wire's Joliet, Ill., plant.

This method of providing blast furnace capacity at Provo would give that plant pig iron in about half the time it would take to put in new units. These older units will also serve a more economical purpose at Utah than if they were left at present locations. Furthermore, the smelting of Western ores has not been done in the larger furnaces which are now almost standard equipment in the East. It is understood that a new but larger volume furnace could be built at Edgar Thomson for approximately what it would take to rehabilitate the two older but smaller furnaces now idle there.

$49 Billions Spent So Far on Defense

• • • **Aggregating** $49,583,000,000, the program for defense spending in the United States at the end of June, 1941, consisted of $45,912,000,000 in Congressional appropriations and contract authorizations and RFC funds and $3,671,000,000 in British contracts. At the same time, United States and British contract awards totaled $27,318,000,000.

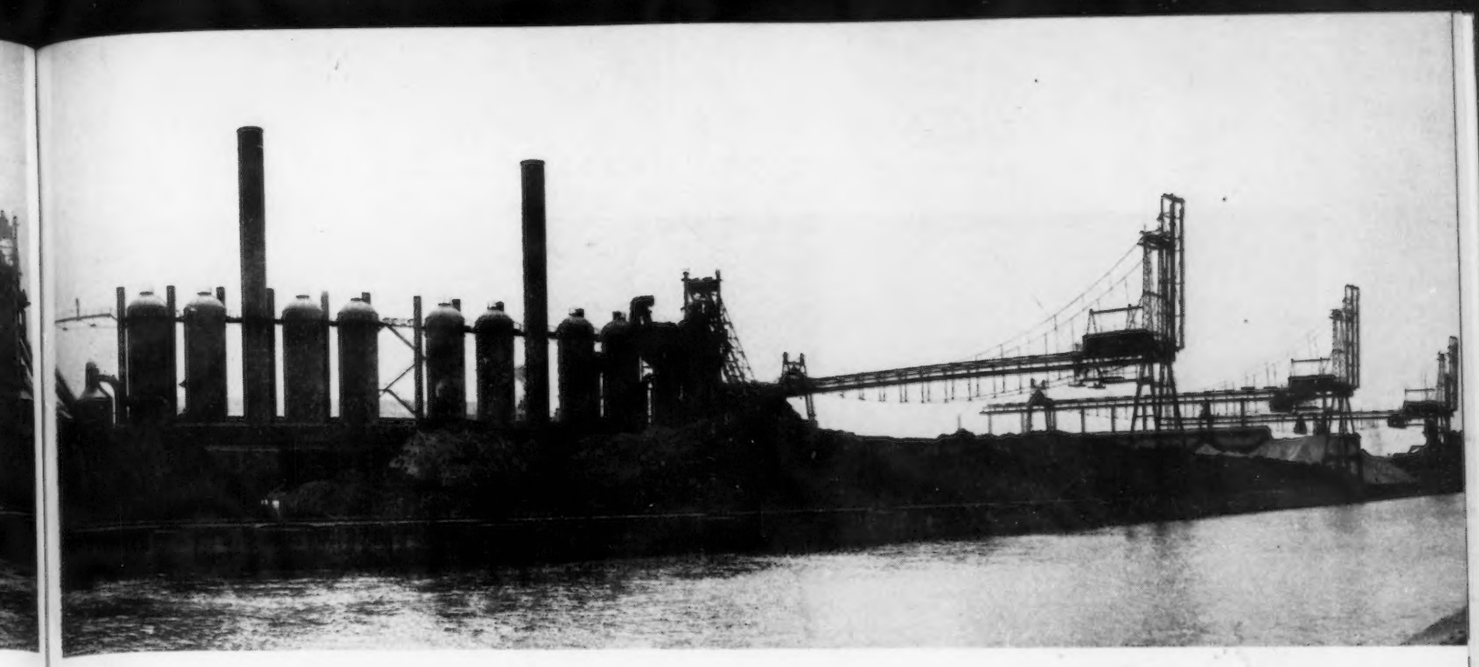
New heavy bomber schedules brought the figure for airplanes up to $11,469,000,000, while airplane contract awards reached a total of $6,122,000,000. The program for naval ships and parts came to $6,430,000,000, while contracts had reached $6,264,000,000. The ordnance program amounted to $8,034,000,000 while awards for ordnance totaled $4,738,000,000.

The following tabulation presents a breakdown by object of defense program and contracts as announced by the OPM Bureau of Research and Statistics:

	Program	*Contracts*
	(In billions of dollars)	
Airplanes	$11,469	$6,122
Naval ships and parts	6,430	6,264
Ordnance	8,034	4,738
Other military equipment and supplies	3,925	2,540
Merchant ships	1,905	1,407
Industrial facilities	5,530	2,767
Posts, depots and fortifications	3,652	2,212
Housing	495	283
Other	1,874	985
Pay, subsistence and travel	6,269	.....
Total	$49,583	$27,318

Steel Construction Institute Convention Dates Oct. 14-17

• • • **The next annual** convention of the American Institute of Steel Construction will be held Oct. 14-15-16-17 at The Greenbrier, White Sulphur Springs, W. Va., V. G. Iden, the organization's secretary announces.



Higher Priority Seen On Steel for Drum, Car Manufacturers

Washington

• • • **Growing complaints** by defense users of steel shortages, emphasized currently by freight car builders and steel drum manufacturers, have given rise to reports that OPM may have to turn to higher priority ratings for such consumers and make a searching inquiry under its newly created compliance section for action against possible violators of priority orders. Director of Priorities Edward R. Stettinius, Jr., in setting up the section indicated that such action may be necessary if efforts to obtain voluntary cooperation fail.

Shortage of steel was the chief topic discussed here last Friday at a meeting of the Board of Directors of the Association of American Railroads, which had before it a report of the American Railway Car Institute that inability of railroad car manufacturers and railroads to obtain delivery of steel under their government priorities is delaying the delivery of freight cars ordered months ago. The report coincided closely with the article in THE IRON AGE of July 17 (pages 83-84), by T. C. Campbell, Pittsburgh resident editor.

Meanwhile 27 steel drum manufacturers met here on Monday of the present week with officials of the OPM Division of Purchases to consider problems arising from the industry's increasing difficulties in getting enough steel plate to meet demands in connection with the defense program.

No official action was taken but it is said that higher priority rating may be asked of the OPM though it was conceded that the A-3 rating is well up from a point of preference. At the same time, as pointed out by THE IRON AGE, steel companies have so many priority ratings that come ahead of the A-3 ratings that unless some outright allocation is determined upon the car builders will be unable to get the needed relief. Likewise some concern is being shown whether priority ratings are being strictly enforced.

Now operating at only half capacity, due to steel shortages, the AAR Board reported that a canvass of officials of railroads and car manufacturing companies showed that the entire car building capacity of the country for nearly 12 months to come will be taken up by orders already placed. Additional orders which will be placed, the board anticipated, will take up the car building capacity for the remainder of 1942. The delivery schedule was said to be about 20,000 cars behind due to lack of supplies.

However, it was stated that transportation requirements for 1941 will be met by equipment on hand or to be delivered this year. It was pointed out that railroads have reduced the number of bad order cars to the lowest figure ever recorded, although some difficulty was reported in securing repair parts and materials for locomotives and cars. OPACS on July 7 announced preference ratings for material and equipment essential to locomotive construction.

The railroad plan for securing the ownership of 1,800,000 cars by October, 1942, was again discussed by the board. Inasmuch as orders placed by individual railroads will insure capacity operations by builders until late next year, no consideration was given to a plan for an industry pool to secure cars through a corporation set up by the AAR, or to a suggestion that RFC order a "stock pile" of rolling stock.

Discussion was given to plans for better utilization of the freight car supply on the part of the railroads, including prompt loading and unloading of cars handling company material, prompt switching and faster turn-around of cars.

Attending the board meeting were Ralph Budd, Transportation Commissioner of the National Defense Advisory Commission and a number of railroad presidents who are not members of the AAR.

Killing Democracy an Inside Job---Sumners

• • • **"This getting 'het up' about democracy and wanting to fight about it while we are doing a complete job, an inside job, of destroying our own democracy and erecting in its stead a great federal bureaucracy, does not make sense nor statesmanship nor common honesty." — Representative Hatton W. Sumners, Democrat of Texas, chairman of the House Judiciary Committee.**

Photo by Wide World

ROLLING OUT THE BOMBS: This workman is shown rolling heavy bomb cases at a plant somewhere in Quebec. Workmen soon become expert at handling the cases in this way.

Urges Putting Idle Machine Tools to Work

• • • **More extensive use** of the defense contract service of the Federal Reserve Bank as a clearing house between manufacturers possessing machine tools now partly idle and government offices placing national defense production contracts was urged Monday by Charles J. Stilwell, president of the Warner & Swasey Co., Cleveland machine tool builders.

"Surveys made by our company and by other sources," Mr. Stilwell said, "indicate that idle time of existing machine tools represents a national defense production capacity larger than that of a whole year's output of new machine tools. These machines must be put to work around-the-clock."

This need is especially urgent, Mr. Stilwell pointed out, because the new bomber program and other increased schedules have created an additional machine tool demand which will become acute somewhere between December and March. The machine tool industry is already straining all its facilities to meet national defense requirements and the time is too short for the new load to be handled by building and equipping additional machine tool plants. The solution, he said, can lie only in putting to work, on jobs they are able to perform, the thousands of existing machine tools now operated only part-time in hundreds of manufacturing plants throughout the country, thereby releasing more new machine tools for aircraft production and similar work requiring extreme accuracy.

"The defense contract service, with offices in the twelve Federal Reserve District Banks and branch offices throughout each district, has collected extensive information showing machine tools and other production equipment now partly idle and available in 30,000 plants throughout the country. Many of these plants are ready and anxious to secure government contracts for defense production and many more are seeking subcontract work from prime contractors.

"But up to now government agencies issuing national defense contracts have apparently made little use of the information gathered by the defense contract service as an aid to locating facilities for prime contracts and assisting prime contractors to secure sources for sub-contract production. Why does not the government steer manufacturers in search of additional machine tools into this gold mine of facts and figures covering the present unused production capacity of the country?" Mr. Stilwell asks.

"Unless the information now in the hands of the defense contract service is spread both ways, and utilized both by government agencies placing defense contracts and by manufacturers in search of defense work, one is inclined to question for what purpose this service exists."

Cutting Tools Subject To Strict Priorities

Washington

• • • **A general preference order** to prevent manufacturers and distributors from accepting an order for cutting tools which does not bear a preference rating of A-10 or higher, has been issued by the OPM priorities division. The order, however, contains the provision that such orders may be delivered if all defense orders on hand have been met.

The preference order, whose issuance was prompted by an increasing shortage of cutting tools, defines cutting tools as including:

"Special drills of all types, oil tube and oil hole drills of all types and sizes, special reamers, countersinks, counterbores, special milling cutters of all sizes and types, hobs of all sizes and types, high speed taps, special taps, high speed chasers for self-opening die heads, high speed chasers for collapsing taps, and machine broaches."

Addressed to both distributors and manufacturers of cutting tools, the order provides also that for a period of six weeks from July 17 manufacturers may continue working on orders which were in production on that date, regardless of requirements made under other preference rated orders received during the six weeks' period; provided that any order with an AA emergency rating must be accepted and complied with at any time.

Upon finding that compliance with an order bearing a higher preference rating interferes with any work in actual production, compliance by the manufacturer with the higher rating may be deferred (except for AA emergency orders) for a period of not more than 10 days. Discrimination against defense orders is prohibited, manufacturers and distributors being required by the order to accept such defense contracts in preference to other contracts offered under substantially similar terms and conditions.

South American Machine Tools Being Imported into U. S.

Cleveland

• • • **What is believed** to be the first shipment of South American-made machine tools ever to be imported into this country arrived in Cleveland this week by way of Argentina and New York. These machines are being imported by Lempco Products, Inc., 5490 Dunham Road, Bedford, Ohio, a suburb of Cleveland. The firm is an automotive parts manufacturer.

James F. Strnad, president of the company, said his concern's first carload shipment of about 47 machines consists of shapers, drill presses, punch presses, die filing machines and hand screw machines. Two additional carloads of machinery are expected to leave Argentina for the United States within a few weeks. Later in the year, the company expects to receive from South American manufacturers large turret lathes, planers, heavy duty drill presses and milling machines.

Mr. Strnad disclosed that his company has made arrangements to serve as exclusive American and British distributors for five machine tool manufacturing companies. Three of the companies are in Buenos Aires, Argentina, and two are in Sao Paulo, Brazil. Their machines will be sold in the U. S., the British Empire and also in Cuba, Mexico, Puerto Rico, Colombia and Venezuela.

The decision to import machine tools was made as a result of the current abnormal demand. The importation of machine tools from South America should further the Government's "good neighbor" policy with these countries, Mr. Strnad believes.

Defense Output Takes 60% Of Pittsburgh Industrial Gas

• • • **Sixty per cent of the** industrial gas sold in the Pittsburgh area is being used to manufacture shells, guns and other defense armament, the Equitable Gas Co. reports. The company's $6,000,000 1941 expansion program, including the drilling of 250 gas wells in Kentucky and West Virginia, and construction of 100 miles of pipeline, will increase production and transmission this winter by 30 per cent.

Photo by British-Combine

ENGLISH LANE: U. S. aid to Britain consists not only of planes, ships, and guns but roadbuilding machinery, like the seven-ton tractor (above) towing a scraper and gouging out a new British defense road. Manning such equipment are highly-trained workers from Ontario.

Ship Shortage Threatens Supply of Manganese

Washington

• • • **That the government** "is understood" to have broken the published specifications and purchased shipments of foreign manganese ores running less than 48 per cent while denying domestic producers a similar reduction in specifications is reported by J. Carson Adkerson, president of the American Manganese Producers' Association in the course of a warning of the danger of a shortage of manganese because of the scarcity of ships.

With proper plants or equipment, according to Mr. Adkerson, domestic ores can be concentrated to 48 per cent as now required by the government. Imported ore of less than that manganese content, Mr. Adkerson said, "will no doubt be blended with other ore to give an average of 48 per cent." To step up production Mr. Adkerson urged government purchase of domestic ores for stock piling and erection of producing plants.

Adkerson estimates that during next year consumption of manganese may reach the record high of 1,500,000 tons annually while now on hand is "probably a year's supply." Domestic production for the current year, it was pointed out, may not total 100,000 tons.

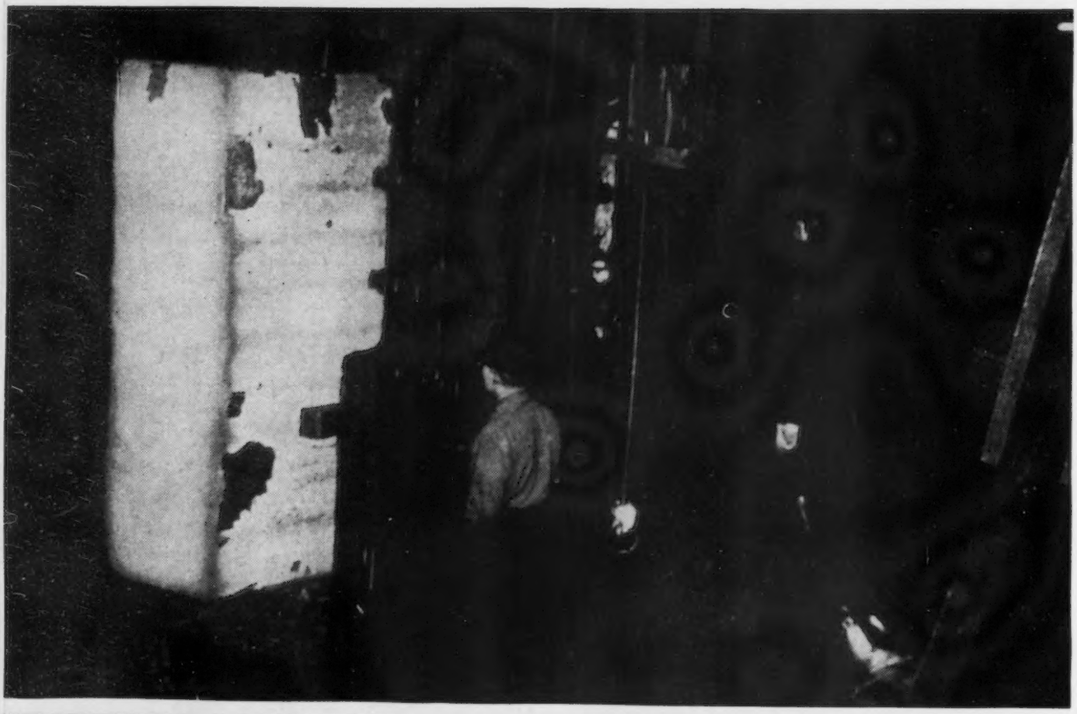
"One new domestic beneficiation plant at Anaconda, Mont., is just starting production of an estimated 100,000 tons per year of concentrates running around 60 per cent manganese," said Mr. Adkerson. "This ore could well be mixed with an equal amount of 40 per cent manganese to obtain a standard grade of 48 per cent.

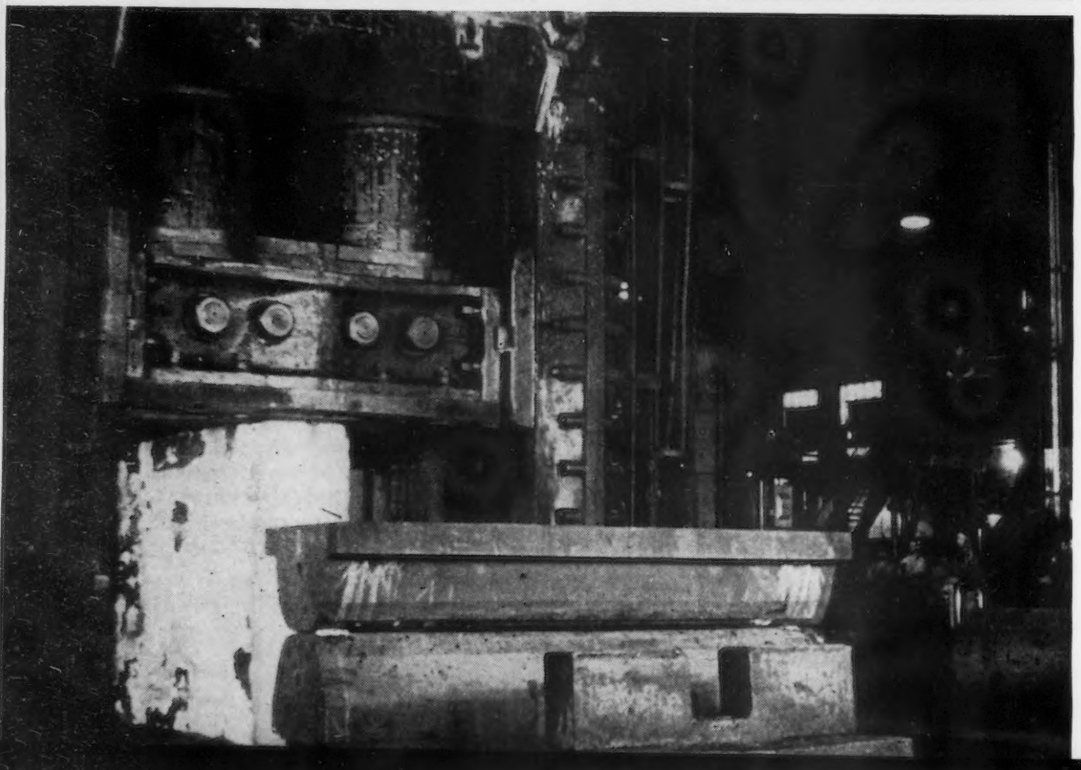
Illinois Defense Orders Less Than Expected, Gaylord Says

Chicago

• • • **Illinois manufacturing** facilities could handle three times the volume of defense orders that have already been placed, Robert M. Gaylord, president of the Illinois Manufacturers' Association and the Ingersoll Milling Machine Co., Rockford, Ill., told members of the association last week here.

"One of the principal reasons why many Illinois industries are not participating in the defense program is that the volume of defense business for which orders have thus far been placed has not been as large as was anticipated," he said. "Illinois has not, in our opinion, received its fair share of the volume of defense business which has been available."





NEWS OF

PICTURE of ARMOR

PRODUCTION of armor plate for America's Two-Ocean Navy is the No. 1 job for U. S. industry. Few plants are equipped to turn out this important product. Few people in industry are familiar with the problems of its manufacture. How armor plate is made is shown in these unusual photographs, taken at Carnegie-Illinois Steel Corp.'s Homestead, Pa., plant.

o o o

Top left photo — This shows an armor plate ingot weighing 200 tons going into a heating furnace and the next view (center left) pictures the ingot in a 12,000-ton forging press, one of the three largest owned by U. S. commercial companies. Two more such presses which, with auxiliary equipment, cost $7 million each, are planned. In the lower left photo the first forging of the plate is shown.

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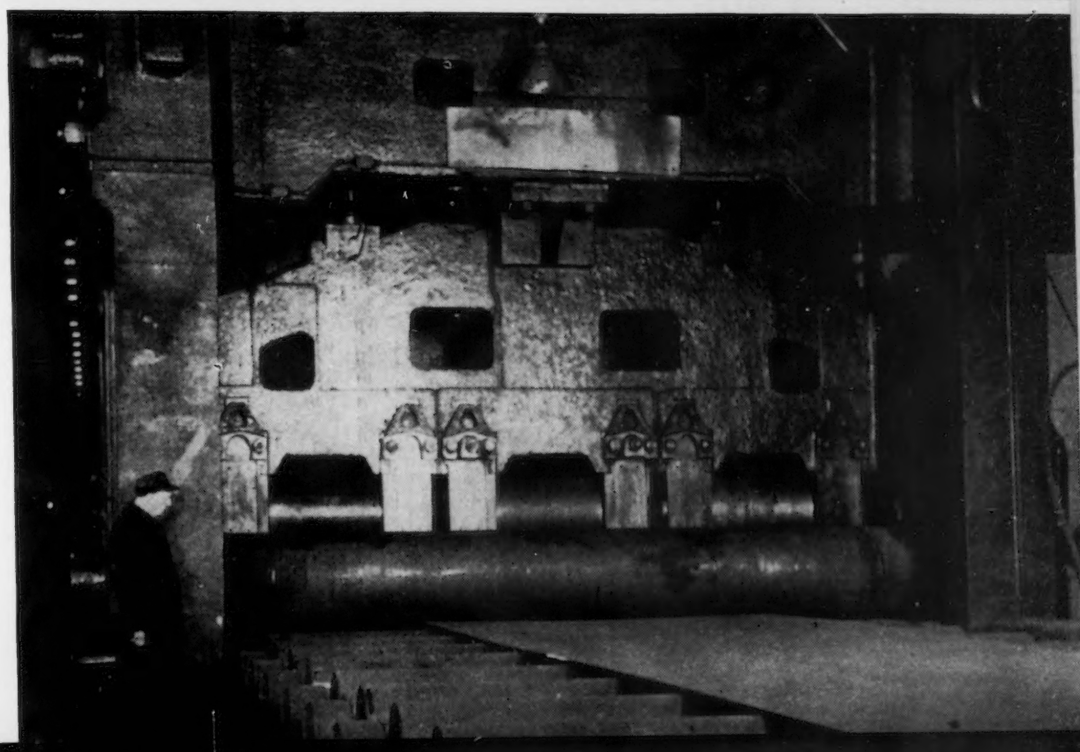
OF INDUSTRY

RE STORY
MOR PLATE



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Top right photo—Here is the final forging operation with the big press being used at its maximum capacity. As armor plate ingots are forged down to the approximate size of the finished plate, they are conditioned to remove surface defects. At the center right is a planer capable of machining plate 15x40 ft. Carnegie-Illinois has 24 such planers in operation. The plate leveler at the lower right can flatten protective deck plates up to 18 ft. wide and 1¾ in. thick. It is the only one in the U. S. capable of doing such work.

(See Page 93c for details on further expansion of the Homestead.)

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Higher Costs, Taxes Cut Republic's Profit

• • • **Republic Steel Corp.,** Cleveland, reports consolidated net profit for the second quarter of 1941 of $5,428,748, after all charges, including income and excess profits taxes, compared with $8,189,966 after all charges in the first quarter. Higher costs and larger provisions for income and excess profits taxes caused the reduction in second quarter earnings, the company said.

Otis Steel Co., Cleveland, reports net profit for the second quarter of 1941, after all deductions, including provision for estimated federal taxes, of $494,072 as compared with net earnings of $594,183 for the first quarter of 1941 and a net loss of $196,629 for the second quarter of 1940. Provision for estimated federal taxes includes allowance for possible additional taxes. A dividend of $2.75 was declared on the company's convertible first preferred stock payable Sept. 15, 1941, to shareholders of record Aug. 30, 1941.

Sharon Steel Corp., Sharon, Pa., reports for the second quarter of 1941 a net profit, before deduction of anticipated increases in federal income and excess profits taxes, of $585,988, as compared with $527,253 for the first quarter. A deduction of $130,000 for anticipated tax increases on earnings of the first quarter and $170,000 on second quarter earnings brings the second quarter figure down to $285,988 net profit. Sales rose in the second quarter to $8,144,557 from $7,501,661 in the first quarter.

Algoma Steel Corp., Ltd., Toronto, for the year ending April 30 last shows net profit after all charges of $911,816 compared with $780,241 in the previous fiscal year. After preferred dividends, net profit was equal to $2 per share on the common compared with $1.62 a year ago. Sales for the year totaled $25,117,776.

Blaw-Knox Co., Pittsburgh, reports earnings for the first half year of $1,220,496, equal to 91 cents per share after providing for all presently anticipated taxes on gross shipments of $14,556,661. These earnings compare with $602,717 or 45 cents per share for the corresponding period in 1940, and $758,030, or 56 cents per share, for the second half of 1940. During June $286,074 was deposited in the sinking fund for the redemption of the first mortgage bonds of the company.

Wickwire-Spencer Steel Co., New York, reports net income of $460,255 for the second quarter of 1941, before provision for taxes, compared with $231,172 for the first quarter and loss of $177,470 for the second quarter of 1940.

↓ ↓

Warner & Swasey Co., Cleveland, reports net earnings for the second quarter of 1941, after all deductions including provision for estimated federal taxes, of $1,263,356, or $1.55 per share as compared with net earnings of $1,040,077 for the first quarter of 1941 and $1,126,011 for the second quarter of 1940. Provision for estimated federal taxes includes allowance for possible additional taxes and contingencies.

Steel Drum Makers Organize Priority Committee

Washington

• • • **Approximately** 40 manufacturers of steel drums met here informally Monday with James MacPherson, assistant chief of the Equipment and Supplies Branch of OPM's Division of Purchases, and considered problems arising from the industry's increasing difficulties in getting enough steel plate to meet demands in connection with the defense program. Mr. MacPherson will select five or six manufacturers to discuss its problems with OPM representatives in the Priority Division to learn what can be done by way of getting preference ratings.

RFC Grants Loan for Tube-Making Machines

Washington

• • • **The RFC has** authorized a loan of $100,000 to American Electric Fusion Corp., Chicago, to be used in connection with the production of tube-making machines.

C-I to Build Twelve 200-Ton Open Hearths

• • • **Carnegie-Illinois Steel Corp.'s** $85 million plant expansion program in the Pittsburgh area will include the building of 12 200-ton open hearth furnaces with an annual capacity of 1,700,000 tons at Homestead, Pa., and two electric furnaces with a yearly capacity of 100,000 tons at Duquesne, Pa.

The C-I program, calling for a much larger increase in ingot capacity than expected, will require the hiring of 4000 new employees, and the razing of more than 1300 houses in preparation of the site.

Erection of two new blast furnaces in the Pittsburgh area is considered a possibility as a result of the C-I expansion, details of which were made known this week when it was announced that 90 per cent of the cost will be met by the Defense Plant Corp. and 10 per cent by the company.

See pages 93A-93B for action pictures of armor plate production at Carnegie-Illinois Steel Corp.'s Homestead plant.

A new 160-in. plate mill, used to roll deck plate, an armor plate forging and machining plant and other units will be built in the C-I program, which is one of the largest steel-expansion projects in recent years. The project was described by William S. Knudsen, OPM Director General, as "definitely necessary" for national defense.

Stettinius Opens Three New Priorities Field Offices

Washington

• • • **OPM's Priorities** Division has established new field service offices in Atlanta, Cincinnati and San Francisco. This brings to 13 the number of regional offices to be maintained by the division.

These district managers were named by Director of Priorities Edward R. Stettinius, Jr.:

John B. Reeves, Southeastern regional manager of Frigidaire Corp., will direct the Atlanta office.

Bruce W. Burroughs, former manager of the Cincinnati branch of the Ford Motor Co., appointed to head the Cincinnati office.

Henderson's 50% Cut In Autos Adds To OPM Confusion

Washington

• • • **Leon Henderson's** announced intention to reduce by 50 per cent the consumption of materials used by the automotive, mechanical refrigerator and washing machine industries was reported this week to have intensified growing hostility between the OPM and OPACS, bringing to a head an inevitable showdown between the conflicting authority of the two agencies.

The Henderson statement, which referred to the suggested curtailment as a "tentative" program, was understood to have caught OPM by surprise. OPACS held conferences early last week with representatives of the three industries but those attending the meetings had been under the impression that any OPACS recommendation would not be forthcoming for some time.

OPM officials working on automobile curtailment were represented as feeling that the Henderson action was not only unwarranted and likely to confuse industry but represented an unjustified encroachment on OPM authority. It was understood in some quarters to have prompted these OPM officials to take the matter direct to the White House in an effort to have the President take a hand in the controversy.

Others said that Mr. Roosevelt already had on his desk awaiting signature an order defining the scope of authority to be vested henceforth in the two agencies. Most observers, however, thought it was unlikely that Mr. Henderson would make the curtailment announcement without express White House backing.

Mr. Henderson named the automobile, refrigerator and washing machine industries as among the largest consumers of industrial raw materials needed for defense and predicted that the curtailment program will necessarily be extended to others in the consumers' durable goods field. He estimated that the automobile industry requires about 1.6 tons of iron and steel per passenger car, and described the program as designed to save for other civilian uses, which cannot be postponed, approximately 4,250,000 tons of iron and steel "as well as substantial amounts of other scarce materials, such as nickel, copper, tin, zinc, aluminum, chromium and lead."

The OPACS head estimated that August, September and October production of automobiles would be 80 per cent of output in corresponding months of last year and would level out to a 200,000 monthly figure in November. Thereafter, the reductions as compared with later months of the last model year would approximate a 50 per cent cut. Production of household mechanical refrigerators would be limited to a monthly maximum of approximately 150,000 units, while mechanical washing and ironing machines would be reduced initially by 30 per cent under the average for the past 12 months. This would be followed by more stringent cuts, Mr. Henderson said.

This places OPACS in a position to direct OPM to carry out an allocation program in accordance with standards fixed by OPACS. Although the OPM priorities division operates under express statutory authority, OPACS by executive order is directed to advise OPM and its recommendations presumably carry the full weight of White House approval.

THIS WEEK'S Priorities and Prices

(OPM)—Cutting tool manufacturers and distributers may not accept orders which do not bear a preference rating of A-10 or higher.

(OPACS) — Hospital equipment, surgical implement and eye-glass frame and parts makers have been granted the highest civilian preference rating on all essential raw materials.

(OPM)—Steel drum producers conferred in Washington early this week on difficulties of obtaining sufficient steel supplies and asked for higher priority rating.

(OPM)—Steel supplies for freight cars was the subject of a meeting of the Association of Railroads on Friday at Washington.

(OPACS)—Anthracite coal prices were discussed last week at a conference with Pennsylvania hard coal operators. Meeting was called because of reports of price advances scheduled for August and September.

(OPM)—Field service offices have been established at Atlanta, Cincinnati and San Francisco.

(OPM)—Greater use of passenger car production facilities for defense work was investigated last week at a meeting Wednesday with the Automotive Defense Industry Advisory Committee.

(OCD)—Aluminum scrap collected in house-to-house collection will be disposed of by procurement division of the Treasury Department. Concentration points for each state where collected metal will funnel from each community were designated last week.

(OPM)—Lack of aluminum will not cause any substantial curtailment of defense activities, although supply situation will be nip and tuck over balance of the year. No new metal will be available for civilian use, the defense agency said.

(OPM)—Lead users should try to place orders with regular suppliers, before making application for allocation of lead held by the Metal Reserve Co.

(OPACS)—Domestic copper production can be increased somewhat over the present rate, it was asserted last week after a meeting with copper company executives and OPM officials.

(OPM)—Defense contracts awarded by United States together with British awards, now total $27,318,000,000. At the end of June the program for U. S. national defense involved $49,583,000,000. Chief item in program is aircraft, accounting for $11,469,000,000.

(OPACS)—Consumption of materials by automotive, washing machines and refrigerator industries is to be reduced by 50 per cent according to a "tentative" program announced by Henderson.

(OPM)—A new 15 member steel industry committee has been appointed to advise on defense problems.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **Thomas F. Troxell,** who has been a partner in the investment banking firm of Riter & Co., New York, has been elected treasurer and director of Copperweld Steel Co., Glassport, Pa. **Sidney D. Williams,** formerly vice-president in charge of steel sales, has been made executive vice-president in charge of the Warren, Ohio, division. **William B. Klee, Jr.,** assistant secretary, has been made assistant to the executive vice-president.

• **J. W. Colgan,** formerly manager of Handy & Harman of Canada Ltd., Toronto, has returned to New York as sales manager of the parent company. He was identified with the New York sales department of the company for 17 years before going to Toronto five years ago.

• **Delbert B. Geeseman** has been appointed general superintendent of Carnegie-Illinois Steel Corp.'s Canonsburg, Pa., works, the tin plate manufacturing plant recently acquired by Carnegie-Illinois from Standard Tin Plate Co. Mr. Geeseman has been Canonsburg manager for Standard Tin Plate since 1928. He entered the tin plate industry with Continental Can Co. at Chicago and in 1919 was transferred to Canonsburg as plant engineer. He was made plant manager in 1928 and district manager in 1930. Mr. Geeseman is a member of the American Iron and Steel Institute and the Engineer's Society of Western Pennsylvania.

• **E. J. Lassen,** who has been engaged in welding application engineering work at the Schenectady works of General Electric Co., has been appointed manager of welding sales for the New York district. He will work with **E. Vom Steeg, Jr.,** welding specialist, and with the Welding Engineering Sales Corp., G-E distributer, in serving northern New Jersey, New York and Connecticut. He has been affiliated with the company since 1934 as a testman after being graduated from North Carolina State University.

• **W. C. Doemel,** heretofore superintendent of Vulcan Mold & Iron Co., Latrobe, Pa., has been made plant manager. **J. Frank Mooney,** who has been connected with the gray iron foundry industry for 30 years, has been appointed superintendent.

• **Stewart McNaughton,** who joined the Baldwin Locomotive Works, Philadelphia, in 1899 as a mechanical draftsman and who spent the next 15 years in the various phases of locomotive design and engineering, has been made general sales manager of the locomotive division.

• **George H. Lee, Jr.,** has been appointed sales representative of the Southern and Southeastern districts for the Pittsburgh Screw & Bolt Corp., Pittsburgh. He succeeds **W. N. Hicks,** who recently resigned.

• **Frank H. Adams,** for 15 years vice-president and general manager of Surface Combustion Corp., Toledo, Ohio, has been elected president, succeeding the late Henry L. Doherty.

• **T. R. Rhea,** who has been identified with the General Electric Co. since his graduation from Massachusetts Institute of Technology in 1924, has been appointed engineer of the chemical section, a new section in the company's industrial engineering department. This has been established to carry on activities which heretofore have been a part of the work of the mining section of the industrial engineering department.

• **Otto L. Weber** has been appointed superintendent of industrial relations at Carnegie-Illinois Steel Corp.'s Edgar Thomson works, Braddock, Pa. Mr. Weber was first employed at the Gary, Ind., works of the corporation as a blue printer in 1908 and has since had wide experience in steel plant operations. His service includes work in the electric, rolling, coke oven, mechanical, maintenance, and general departments of Gary works. Since 1939 he has been assistant to the maintenance

THOMAS F. TROXELL, treasurer and director of Copperweld Steel Co.

J. W. COLGAN, new sales manager of Handy & Harman.

division superintendent in charge of personnel matters.

• **D. R. Laughter,** former sales engineering manager for the Sheffield Gage Corp. (now Sheffield Corp) at Dayton, Ohio, has organized a new firm know as Production Products Co. at 104 East Third St., Dayton. Associated with him will be **E. W. Curlett,** chief engineer, **W. C. Richardson,** sales engineer, **R. H. Deady,** sales engineer and **Fritz Krumholtz,** office manager. The services of the company will include plant layout, development of new products, designing of tools, gages, dies, fixtures and special machines, estimating and engineering counsel.

• **Paul Linz** has been appointed commodity specialist in OPACS Price Division. He has resigned as a partner in Carl M. Loeb, Rhoades & Co., New York, to assume his duties at OPACS, where for the present he will devote his attention principally to lead.

• **W. L. Gourley,** president of Lehmann Machine Co., St. Louis, has been elected treasurer, also. **L. A. Carter** has been made secretary. **Paul Lehmann** and **A. H. Lehmann,** formerly vice-president and secretary respectively, have resigned.

• **Howard T. Walsh,** vice-president and director of Sullivan Machinery Co., Michigan City, Ind., has retired on pension after 41 years of continuous service. Upon graduation from Worcester Polytechnic Institute, he joined the company and served successively as salesman in the Denver territory, Pacific Coast manager, London manager, general sales manager and vice-president and director.

• **L. L. Horchitz,** since 1929 manager of the Los Angeles district of the mechanical goods division of the B. F. Goodrich Co., Akron, Ohio, has been named manager of the newly-created California district of the company. Headquarters will be at Los Angeles, with a branch office in San Francisco. **H. A. Schultz** has been made branch manager at San Francisco, succeeding **W. D. Rigdon,** who has retired after having been identified with the company since 1922. **C. M. Christensen** has been appointed manager of the Denver district, succeeding **Max Schmidt,** who remains on the district staff in an advisory capacity.

• **L. P. O'Neill** has been assigned to the Chicago territory of the Clover Mfg. Co., Norwalk, Conn. He has had a long experience in the coated abrasive industry. **L. W. Kilpatrick** has been made sales representative to cover North and South Dakota, Minnesota, and northern Iowa. **Gerald R. Barrett** has been transferred from metropolitan New York area to Boston to serve the New England territory.

• **Arnold G. Lenz,** Flint, assistant manufacturing manager in charge of the Flint, Saginaw and Bay City plants of the Chevrolet division of General Motors Corp., has been promoted to the post of assistant to **Hugh Dean,** assistant general manufacturing manager of Chevrolet at Detroit. Mr. Lenz will have offices in Flint and Detroit.

• **J. Fred Jennings,** retiring superintendent of equipment for Michigan Central Railroad, was honored at a testimonial banquet in Detroit at Hotel Statler on July 10, attended by several hundred railroad men and executives. At the same time, it was announced that **M. Roy Benson,** formerly master mechanic of Michigan Central at St. Thomas, Ont., would succeed Mr. Jennings.

• **F. B. Shay,** mining engineer of the Foote Mineral Co., Philadelphia, is leaving for a trip to Cuba to investigate manganese, chrome and other mineral deposits.

• **Philip N. Cooke,** sales manager of the Norton Co. of Canada, Ltd., Hamilton, has been appointed resident manager, succeeding the late Robert C. Douglas. Mr. Cooke, who has been with the Canadian plant since its beginning, having left Worcester in 1920 as one of the original Canadian-Norton organization, has been sales manager for more than 15 years. **D. M. Chisholm,** of the Canadian sales organization, has been made sales manager.

• **Charles A. Kirk,** formerly executive assistant of International Business Machines Corp., Endicott, N. Y., has been elected vice-president in charge of manufacturing, succeeding **Charles R. Ogsbury,** who has been made president of National Postal Meter Co., Rochester, N. Y.

Obituary

• **Lawrence McCarthy,** president of the Hub Steel Co., Detroit, and a former president of the Associated Steel Fabricators of Detroit, died recently. He was born in Youngstown, 48 years ago.

• **Adolph C. Eckert,** for 50 years employed by Cleveland Punch & Shear Works Co. and until recently treasurer of the company, died June 29 at his residence in Cleveland at the age of 77.

• **R. N. Magill,** purchasing agent for Alabama By-Products Corp., Birmingham, before his retirement about two years ago, died at Birmingham July 10, aged 81 years. He had held that post for about 14 years.

• **Robert C. Farrington,** since 1919 chief mechanical engineer of the Austin Co., Cleveland, died of heart disease at St. Joseph's Hospital, Fort Worth, Tex., on July 15, aged 59 years. He was graduated in electrical engineering from Syracuse University in 1903 and after spending a number of years in professional engineering work, became president and general manager of the York Engineering Co., York, Pa. He continued in that capacity until he joined the Austin Co. in 1919.

• **Bernard G. Koether,** veteran executive of General Motors Corp., died recently at the age of 63. He joined the Hyatt Roller Bearing Co. at Harrison, N. J., in 1901, and went to Detroit as sales manager of Hyatt's automotive bearings division eight years later. In 1920 he returned to Harrison as vice-president in charge of sales and assistant general manager. After Hyatt became a part of General Motors, Mr. Koether returned to Detroit in 1923 as director of General Motors sales section. He was made director of customer relations in 1935 and retired in 1937.

• **Austin T. White,** a pioneer in the tin smelting industry and formerly a prominent figure in the Boston metal industry, died suddenly at the Union Club, Boston, July 16.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	July 22, 1941	July 18, 1941	June 24, 1941	July 23, 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	July 22, 1941	July 18, 1941	June 24, 1941	July 23, 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	31.34	31.34	31.34	30.34
Feromanganese‡	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$18.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	17.25
Carwheels, Chicago	....	....	....	19.00
Carwheels, Philadelphia	....	....	....	20.75
No. 1 cast, Pittsburgh	22.00	22.00	22.00	19.75
No. 1 cast, Philadelphia	24.00	24.00	24.00	21.25
No. 1 cast, Ch'go*	21.00	21.00	21.00	16.75

*Changed to gross ton basis.

Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$6.125	$6.125	$6.125	$4.25
Foundry coke, prompt	6.875	6.875	6.875	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	53.75	53.50	52.75	51.125
Zinc, East St. Louis	7.25	7.25	7.25	6.25
Lead, St. Louis	5.70	5.70	5.70	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 110-116 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 22, 1941	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.261c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1941			$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.261c., Jan. 2	2.211c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Homestead plant expansion to lift Pittsburgh ingot capacity almost 10 per cent . . . Operations rise a point to 99½ per cent . . . New OPM steel committee to tackle shortages . . . Lack of scrap to maintain melting rate brings stabilization showdown nearer.

HEAVY pressure for steel to be used in building the two-ocean Navy and in completing other projects under the vast National Defense Program this week brought out details of the large increase in capacity planned for Carnegie-Illinois Steel Corp.'s Homestead, Pa., plant.

Ingot capacity at Homestead and the nearby Duquesne, Pa., plant of Carnegie-Illinois will be lifted by 1,800,000 tons yearly through the construction of 12 open hearth furnaces of 200 tons capacity each and of two electric furnaces with an annual output of 100,000 tons.

The magnitude of the Homestead expansion, coming as it does in a series of announcements of other government defense projects involving hundreds of millions of dollars, may be shown by the fact that the project will lift steel capacity of the Pittsburgh district, already largest in the industry, by almost 10 per cent. At the same time the Homestead project will cover almost one-fifth of the OPM's recent demand that steel capacity be raised 10 million tons annually, and will send United States Steel Corp.'s capacity for making ingots well over the 30 million ton level.

REVEALING of details of the Homestead expansion, which will permit a sharp increase in production of needed armor plate and other items within 12 months, emphasizes the need for blocking steel ingot production losses from existing plants. Thousands of tons of steel are being lost in the Mahoning Valley, Youngstown district steel makers report, because of lack of water for mill operations. The recent one-day shutdown caused by a wildcat strike at a Detroit steel plant stopped production of some hundreds of tons of vitally needed steel. In the Pittsburgh area alone it is estimated that the present steel scrap tightness and the trend to undergrading is costing a loss of upwards of 50,000 tons of ingots a month.

Steel plant schedules for the week show that ingot production for the country as a whole is at 99½ per cent, a gain of a full point over last week's revised level of 98½, with Chicago district activity up a point to 101 per cent, Cleveland up a point to 100 per cent and other districts little changed. Performance of the steel industry in maintaining such high operating rates over a long period without a significant letdown is surprising some steel plant operators.

Steel producers, however, find themselves getting closer to the point where they will need more iron, either in the form of scrap or pig metal, to maintain the current high rate of steel production. On Monday the stock pile of an Ohio steel plant, which normally uses 13,000 tons of scrap monthly, contained only 600 tons. Leveling off in the quality of scrap has forced the equivalent of a higher price for some scrap buyers, who are now accepting less desirable grades. When price control went into effect, it forced inspection to the lower level and undergrading had to occur at places where scrap inspection previously was rigid. In order to stimulate a better flow of scrap, many scrap experts now advocate immediate action toward better prices in remote areas, principally west of the Mississippi River.

COMPLAINTS by defense users of steel shortages, emphasized currently by freight car builders and steel drum manufacturers, suggest that the OPM may have to turn to higher priority ratings for such consumers. The OPM priorities division, following issuance of preference ratings to freight car builders, this week issued two blanket preference ratings covering materials for the construction and repair of locomotives. Some of these steel shortage problems will be tackled by the OPM's new steel advisory committee of 15 top steel officials which was scheduled to meet Wednesday (July 23) and assign special subcommittees to deal with various products.

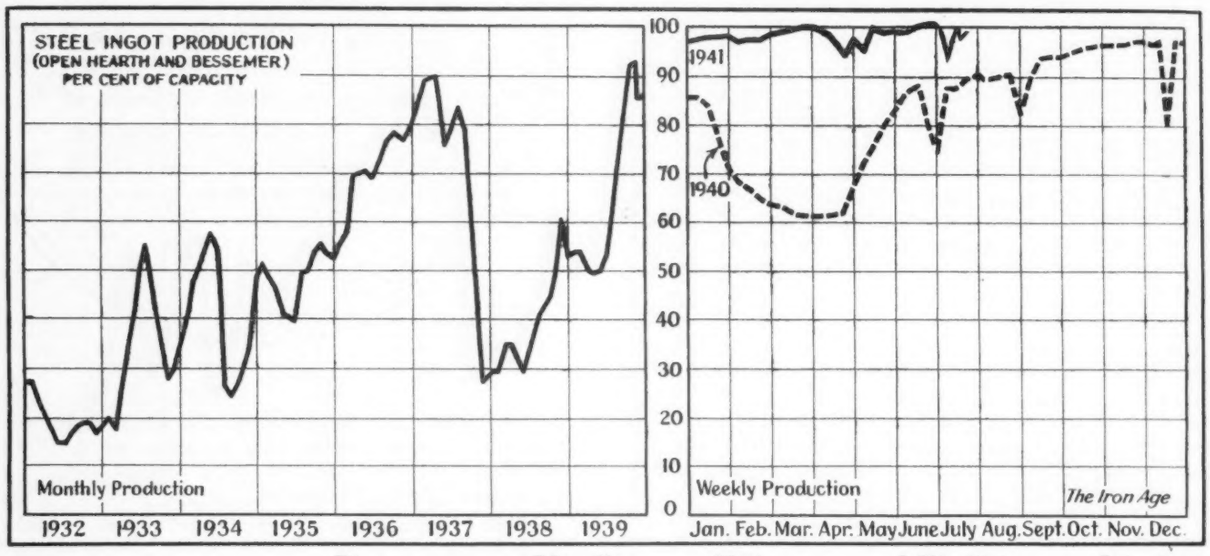
New orders reaching the mills still reflect considerable non-defense tonnage, much of it for the automobile industry which is threatened with an even more drastic reduction in its next year's output, but bookings are decidedly on the defense side. Structural steel awards, due largely to the defense program, climbed sharply for the week to 39,950 tons from 11,150 tons last week. Outstanding lettings were 7500 tons at Minneapolis for the Twin-Cities ordnance plant, 7500 tons for an ordnance plant at Des Moines, Iowa, and 3800 tons for the General Electric Co. ship propulsion gear plant at West Lynn, Mass. New structural projects advanced to 30,300 tons from 21,255 tons last week. Reinforcing steel awards for the week declined to 5650 tons from 11,130 tons. New reinforcing steel projects advanced to 24,925 tons from 21,185 tons last week.

The Industrial Pace . . .

Continuing the trend of the past several months, THE IRON AGE capital goods index moved up 1.3 points last week to 122.7 per cent of base years. While heavy construction awards, totalling $206,765,000, were somewhat lower than the preceding week's high, they place third among the record construction weeks. The heavy volume of business during the past two weeks was instrumental in raising the construction component to 147.4, a net gain of 26.9 points over the past half month.

The drop in automobile production last week was more than offset by seasonal adjustments, raising this component slightly to 111.0. The decline in steel ingot production was due largely to labor difficulties in the Detroit area. With operations failing to return to normal after the coal miners' vacation, Pittsburgh coal production and originating shipments were substantially below normal in the past week, causing a decline of 3.4 points in the Pittsburgh series.

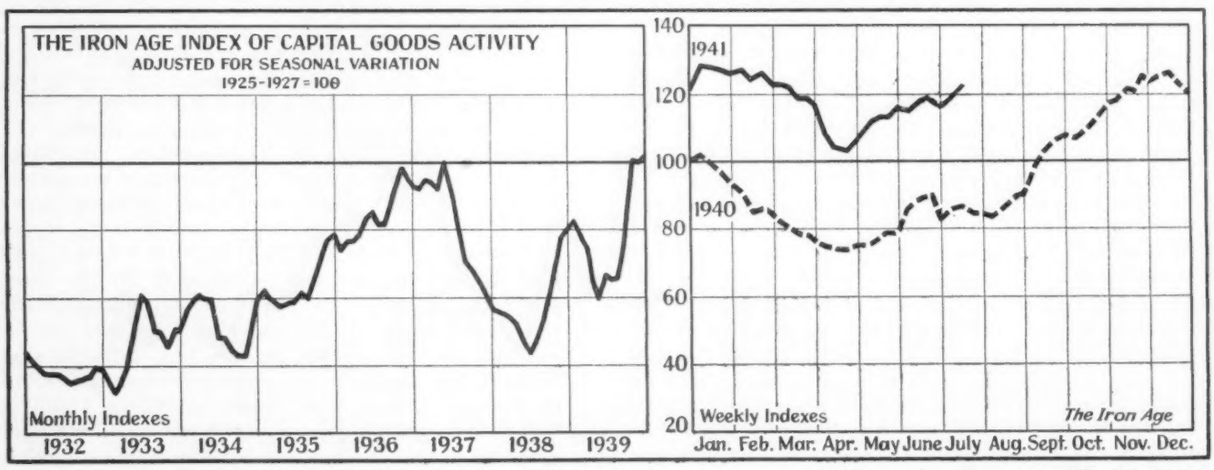
Ingot Operations Advance One Point to 99.5%


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Production
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
100 90 80 70 60 50 40 30 20 10 0

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week ..	100.0	101.0	99.0	97.5	100.0	106.0	90.0	104.5	95.0	101.5	102.5	111.0	95.5	99.5
Previous Week..	100.0	100.0	99.0	97.5	99.0	106.0	90.0	*98.5	95.0	105.0	102.5	111.0	95.5	*98.5

*Revised

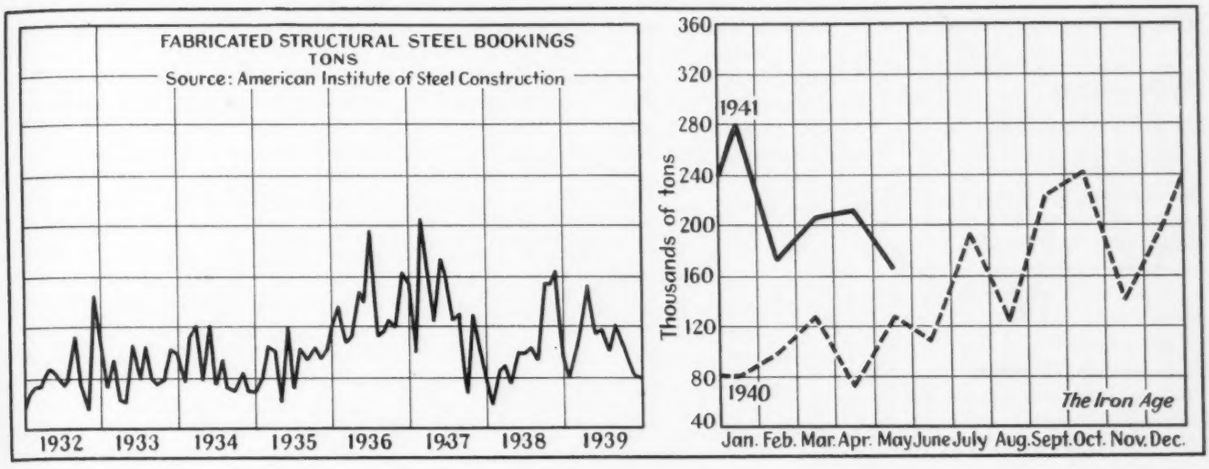
Capital Goods Index Continues Upward Trend


THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-1927 = 100
Monthly Indexes
1932 1933 1934 1935 1936 1937 1938 1939
1941
1940
Weekly Indexes
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
140 120 100 80 60 40 20

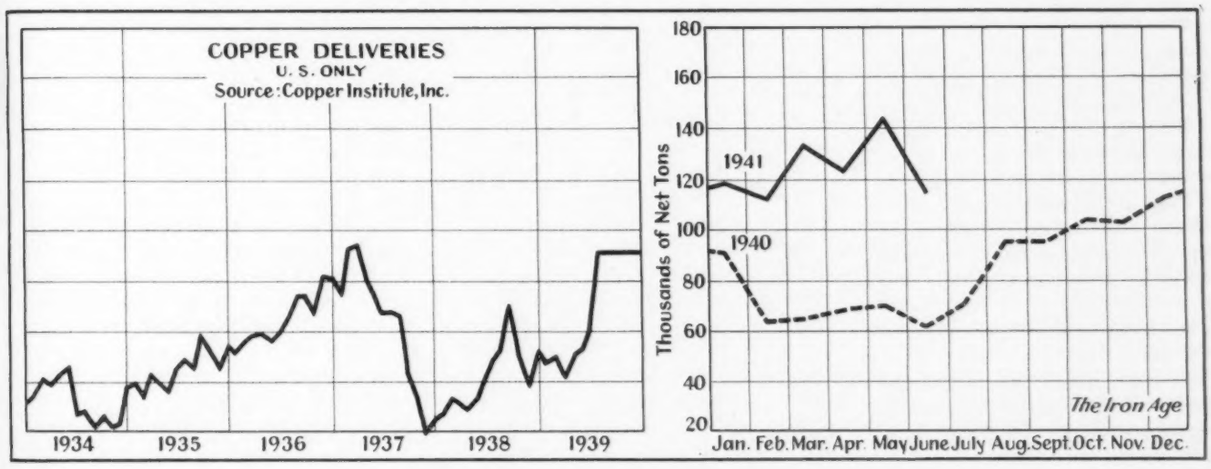
Component ▼ Week Ended ➤	July 19	July 12	June 21	July 20, 1940	July 20, 1929
Steel ingot production[1]	140.8	144.6	145.3	125.8	141.4
Automobile production[2]	111.0	110.4	121.8	53.5	127.2
Construction contracts[3]	147.4	134.7	118.9	82.9	121.4
Forest products carloadings[4]	83.8	83.2	75.9	59.6	125.0
Pittsburgh output and shipments[5]	130.7	134.1	130.1	108.7	131.0
COMBINED INDEX	122.7	121.4	118.4	86.1	129.2

Sources: [1] THE IRON AGE; [2] Ward's Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended July 12. Other indexes cover week of July 19.

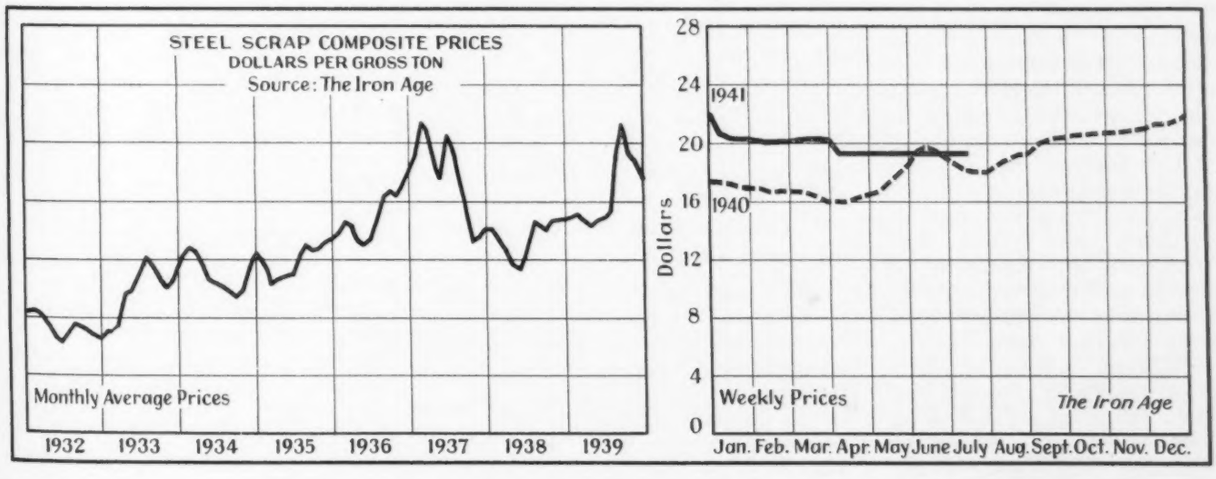
May Structural Orders Lowest This Year


FABRICATED STRUCTURAL STEEL BOOKINGS
TONS
Source: American Institute of Steel Construction
1932 1933 1934 1935 1936 1937 1938 1939
Thousands of tons
360 320 280 240 200 160 120 80 40
1941
1940
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
The Iron Age

June Copper Deliveries Slump 20%


COPPER DELIVERIES
U. S. ONLY
Source: Copper Institute, Inc.
1934 1935 1936 1937 1938 1939
Thousands of Net Tons
180 160 140 120 100 80 60 40 20
1941
1940
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
The Iron Age

Stabilization Holds Scrap at Year's Low Point


STEEL SCRAP COMPOSITE PRICES
DOLLARS PER GROSS TON
Source: The Iron Age
Monthly Average Prices
1932 1933 1934 1935 1936 1937 1938 1939
Dollars
28 24 20 16 12 8 4 0
1941
1940
Weekly Prices
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
The Iron Age

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . Consumers becoming adapted to "feverish pitch"

Steel consumers and producers are becoming more accustomed to the sustained feverish pitch of activity, reports CLEVELAND. A better appreciation of the immensity of the defense program exists. At the same time, however, little or no progress has been made toward clearing up certain foremost problems. Seeking highest priority to facilitate the expansion of a plate mill, one producer has encountered a discouraging amount of red tape, yet plates are urgently needed for the defense program now and by next year the demand will be far greater.

Shipments still reflect considerable non-defense tonnage, but bookings are noticeably on the defense side. During the past week large tonnages of reinforcing bars for armament projects were placed on mills' books. Orders from farm equipment makers now engaged in defense work were heavy. Shops fabricating structural steel are jammed with defense work, so much so that a few complaints have been voiced.

After regulations are put into effect governing pig iron shipments, it is expected that even closer control will be exercised over steel deliveries than heretofore.

Some authoritative sources at PITTSBURGH predict that within three or four months practically all steel will have to be purchased on some sort of preference or priority rating. It is difficult for producers to measure total volume in relation to production except to generalize that incoming orders far exceed the current rate or steel output. Most steel makers continue to quote and sell finished steel on the old basing point system. Only where government allocation of steel orders entails distant deliveries do steel producers resort to the alternative method permitted by the OPACS of quoting an f.o.b. price. This policy is generally ruling in the industry, which has accepted the spirit, rather than the letter, of the recent price ruling of the OPACS which would permit better net returns if imposed on all business.

Despite clogged order books CHICAGO mills have accepted about 15 per cent more business this month than in June. Wobbly inventory position of jobbers is worrying mills, some predicting that Washington will have to provide preferences for these people. Priorities for farm implement manufacturers are getting increasing concern in that district which is the center of implement business. So far steel mills have met farm demands capably but the situation needs help. Several important CHICAGO mills have reached the point where they will soon launch construction of additional production facilities.

Contractors engaged on non-defense projects are having increased difficulty in obtaining material from BIRMINGHAM mills. Requests from all sources for tonnages continues to exceed production capacity. Heaviest demand is for plates and bars.

Bookings of district steel mills in the SOUTHERN OHIO area are no exception to the general trend in the entire country. Constantly mounting defense requirements have pushed the sheet orders from this source close to 40 per cent of capacity. Jobbers indicate a continued high demand for warehouse products, with structurals being especially strong.

Consumers in the ST. LOUIS area are endeavoring to place business for the first quarter of 1942. Some mills are said to be taking orders on the basis of prices at time of shipment, but with no guarantee of shipment.

Operations

. . . Ingot production gains to 99.5 per cent

Steel ingot output for this week is estimated by THE IRON AGE at 99.5 per cent. This figure compares with last week's revised estimate of 98.5 per cent. The revision was due to an adjustment in the Detroit rate. Great Lakes Steel Corp., Detroit, lost 24 hours' production in its open hearths because of a wildcat strike last week. The production figure reported early last week was in anticipation of the probable shut down of the plant for the entire week, since at press time none of the furnaces were operating. Schedules for the Detroit district this week are up at 104.5 per cent. No other outstanding changes in district production schedules have taken place.

Pig Iron

. . . Strict allocations seen soon; non-integrated makers alarmed

Producers and consumers of pig iron in the PITTSBURGH area have their ears to the ground awaiting possible developments this week in Washington which may affect both the distribution of supplies and the method of quoting prices. The increasing unbalance between supply and demand is believed to be leading to the early imposition of strict allocations, on a preference rating basis, under supervision of the Priorities Division of the OPM. Some non-integrated steel makers are becoming alarmingly short of pig iron and are also not receiving any offsetting support from scrap supplies. Consequently, it is held by some in the PITTSBURGH district, strict rationing of supplies may be necessary to avoid any severe hardships where the flow of pig iron may be vital to the defense.

Some pressure is being brought to bear upon price officials at Washington to permit certain merchant pig iron producers, who are beset with high producing costs, to sell on an f.o.b. furnace basis instead of being compelled to equalize freight to a destination outside their producing districts. For example, an Ohio furnace would willingly furnish pig iron to the PITTSBURGH district, where steel-making iron is especially tight, but the absorption of freight is held to be too costly to permit serving this district.

The Carnegie-Illinois Steel Corporation will "blow out" its Carrie Furnace No. 4 at Rankin, Pa., on July 24, for rebuilding. The present rated capacity of this stack, at

about 240,000 tons annually, is expected to be surpassed when the stack is rebuilt.

Among recent large domestic inquiries, pig iron tonnages have been sought by Ford Motor Co. Such a tight situation exists on deliveries, however, that it is doubtful whether Ford will obtain anywhere near the tonnage desired. In some quarters in the pig iron industry it is expected that additional inquires on behalf of Great Britain will make their appearance in the next few weeks.

Unable to obtain full satisfaction from producers of regular foundry grades of pig iron, foundries have in recent weeks been buying charcoal iron heavily, willingly paying the substantial differential. Most charcoal furnaces are now heavily booked forward and have established restrictions on acceptance of further orders.

As a consequence of regulations promulgated by OPACS, many consumers currently taking shipment on contracts placed on the basis of "price in effect at time of shipment" are paying higher prices than previously due to the changes in analysis differentials, especially manganese. Some shipments, however, originally booked at a specified price, are still going out at the old price.

Furnace interests generally, are sitting back in the SOUTHERN OHIO district, waiting for a complete clarification of government price rulings. It begins to look as though the Hamilton Coke & Iron Co. is out of the merchant iron market "for the duration" since the Middletown unit of the American Rolling Mill Co. is taking all the hot metal now being produced at these two stacks.

The BUFFALO area's largest producer of merchant pig iron this week admitted its reserve stock of pigs is "just about gone." This company, as well as all others in the district, are sold out for the third quarter.

Semi-Finished Steel

. . . British orders hamper mills own rolling departments

Until production is completed on the recent British orders for semi-finished, the mills' own rolling departments will continue to suffer under smaller allotments. The situation holds every promise of becoming tighter than at any other time in the history of the industry.

Best means of assuring fairly regular supplies of semi-finished steel is still a reciprocal agreement between detached and integrated mills, virtually exchanging scrap produced by the non-integrated unit for semi-finished material. On a whole, steel producers in the PITTSBURGH area are reflecting a cooperative attitude in the matter of serving non-integrated mills.

Tin Plate

. . . Banner crops increase pressure for earlier shipments

Integrated tin plate producers are maintaining capacity production schedules, while some detached makers are running slightly behind the general average owing to the difficulty of obtaining uninterrupted supplies of hot strip. Banner crops, in some cases far exceeding earlier estimates and running two and more weeks ahead of schedule, are accounting for unrelenting pressure for shipments of tin plate, which, on a whole, are matching the record pace of June. British quotas are being produced on schedule.

Tin plate production in CHICAGO will be at capacity beyond the first of the year. Even some normal sheet production is going to tin plate to meet demand.

Railroad Buying

. . . 53 locomotives, 1300 freight cars placed

Orders totaling 53 locomotives, 1300 freight and 170 passenger cars have been announced in the past week with pending orders amounting to 3500 freight cars and 40 locomotives. Last week's purchases were 50 locomotives, 1300 freight cars and 65,000 tons of rails.

These outstanding locomotive construction programs were made public: Pennsylvania is to build in own shops seven 8000-hp. electric engines, American Locomotive Co. will produce eight articulated 4-6-6-4 units for the Clinchfield and 10 type 2-8-4 locomotives for Wheeling & Lake Erie. St. Louis Terminal has placed five heavy diesel-electric switchers with Baldwin and five with American Locomotive Co.

Baldwin Locomotive Works will build the following diesel-electric units: two for Elgin, Joliet & Eastern, two for Southern, one for Western Maryland and one for Upper Merion & Plymouth; Davenport-Besler Corp. has orders for nine diesel-electric engines from the Army and one from Ohio & Morenci; and General Electric two from Boston & Maine.

Freight car orders include: Central of New Jersey, 1000 gondolas awarded to Bethlehem; Wabash, 100 gondolas to company's shops; United Fruit Co., 100 banana cars to Pullman-Standard; New York, New Haven & Hartford, 50 cabooses to Pullman-Standard; Army, 50 large tank cars to General American Transportation Corp.; Navy, 40 flat cars to Haffner Thrall Car Co., and Western Maryland, four heavy flat cars to be built in own shops. The Pullman Co. has ordered 170 passenger cars from Pullman-Standard Car Mfg. Co.

Missouri-Kansas-Texas is planning to reconstruct 2000 freight cars at its Denison, Tex., plant. Missouri Pacific and the affiliated roads of Gulf Coast Lines, Great Northern and Missouri-Illinois are reported to be contemplating buying 1450 box, 500 hopper, 950 coal and 150 flat cars. Mexican National Railroads are in the market for 40 locomotives and 105 passenger, mail and baggage cars, and the Argentine State Railways for 375 box and 50 baggage cars.

Around 2000 tons of heavy standard rail will be required for completion of yards at the shell loading plant in Ravenna, Ohio. Relaying rails were sought originally.

Plates

. . . Car program can take full year's production at Chicago

Chicago steel makers believe the railroad car program will provide a full year's activity for mills. Railroad tonnage is seeping over into every available nook to satisfy pressure for delivery. Report that 56,000 tons have been allocated for Panhandle & Eastern pipe line running from Amarillo,

Tex., to Detroit, promises more grief for crowded plate mills.

Rolling schedules of one EASTERN PENNSYLVANIA producer will be 100 per cent for defense next week. Normally this mill rolls about 60 per cent defense, but in order to ease certain production problems in defense plants, all of next week's production will go directly into war work.

Export Trade

. . . No further shipments from Atlantic ports to Far East

Steel exporters have been advised that effective Aug. 9, no further shipments will be made to Far Eastern ports, as the East Indies, from Atlantic Coast ports. This action, centering all Far Eastern shipments from the Pacific Coast is part of a general move to speed up movements of trans-Pacific ships. Details of the blacklist of Latin American companies with whom trading by United States companies is prohibited will be found on page 103.

Iron Ore

. . . Canadian vessels enter American ore trade

Participation of Canadian lake vessels in the American ore trade has begun on a modest scale. While several ships have left the Canadian grain trade temporarily, it is expected they will return to it when opportunities permit. American vessel operators estimate that perhaps as high as 500,000 to 750,000 tons may be carried between American ports by Canadian boats this season.

Consumption of Lake Superior district iron ore in June slipped slightly from May. In the one-day shorter month 6,231,067 gross tons were consumed against 6,232,213 in May. The report of the Lake Superior Iron Ore Association shows consumption for the year to July 1 reached 36,681,083 tons, a corrected total, a pace which if continued would mean over 73,000,000 tons consumption per year. Consumption to July 1, 1940, totaled 27,332,666 tons.

Stocks of Lake Superior iron ore at furnaces and on lower lake docks totaled 26,629,670 gross tons compared with 23,515,802 tons a year ago and 21,816,898 tons at the start of June, 1941.

Furnaces in blast depending chiefly on Lake Superior iron ore totaled 175 on June 30 compared to 169 on May 31.

As usual the consumption figures include open hearth consumption.

Buying Begins for New Brazilian Mill

Cleveland

• • • Purchasing has begun for the new Brazilian steel mill which will be erected with United States financial assistance. The first contracts were for turbo blowers and turbo generators. Coke ovens are expected to be awarded this week.

A blanket B-1 priority for the whole $25,000,000 project was granted. Where higher status is required separate applications probably will be filed for specific equipment. Arthur G. McKee Co. here holds the general contract. A group of Brazilian engineers has been here for several months.

Sheets and Strip

. . . OPACS auto curtailment order to slash sheet output

The 50 per cent cut in production of automobiles and light trucks, refrigerator and laundry equipment mandated by the *OPACS* is expected to result in sharp curtailment in the output of sheets and strip, since a large part of the slack thus provided will be taken up, it is expected, by the rolling of plates on high-speed strip mills. Thus far, however, large producers at Pittsburgh contend there has been no extreme difficulty in meeting defense orders, although the volume of this business is progressively increasing. Backlogs of all types of orders, including known British requirements, extend on some finishes of sheets from six months to one year. High priority rating orders, however, can be filled, in some instances, within 45 to 60 days which is considered reasonably good delivery in the face of the necessity of "freezing" mill schedules for one month on some sheet items requiring extensive finishing. Up to the present, there has been no slackening in the demand for sheets and strip from the automotive industry, despite the impending production slash and a rapidly descending scale of 1941 model production.

The pronounced defense trend is shown very clearly in scrutiny of recent orders at CLEVELAND and YOUNGSTOWN. Weekly shipments which often include numerous short notice defense tonnages, show more gradual change. Annealing capacity continues to be overtaxed at most mills.

At least two CHICAGO mills have converted close to 50 per cent of normal sheet capacity to production of plates, with indication that the trend is not at an end. Cold rolled sheets are still going to automotive builders. Steel sheet salesmen report increasing consideration by home appliance manufacturers to convert production facilities to defense to keep factories going. One producer lengthened deliveries on 2½ in. and under strip to eight to nine months.

Priority orders for sheets in the SOUTHERN OHIO district continue to mount. The leading district interest estimates that defense business is close to 40 per cent of its capacity. Normal sheet users are constantly being shunted aside in the face of the mounting defense needs, although no serious pinch is reported.

Merchant Bars

. . . Lack of raw steel hampers production at Youngstown

Mill operations are suffering from lack of raw steel at CLEVELAND and YOUNGSTOWN, particularly the latter city where pipe mill needs are heavy. Meanwhile, inquiries continue exceptionally brisk, involving large tonnages of all types of hot rolled and cold drawn bars. Actual bookings for the auto industry appear to have slackened recently.

The increasingly rapid tooling up of defense plants for ammunition manufacture is being reflected in the swelling volume of high priority orders for hot-rolled bars. Within the next 60 days, according to PITTSBURGH sources, the expectation is that only a minor percentage of hot-rolled bar production will be available for non-essential users and that before mid-fourth quarter all bar orders will be purchased

under some sort of rating classification. Practically all output is currently being allocated, on an informal basis, and customers buying bars for defense work in this district express satisfaction with the manner bar makers are handling this difficult problem. This opinion holds despite the fact that bar users are being forced to curtail their production schedules on the basis of current receipts of steel. Cold-finishers, while generally maintaining full-time schedules on an hourly basis, are finding their tonnage output hampered by lack of hot-rolled bars.

Least affected so far by defense requirements, CHICAGO producers are now facing scrambling of bar schedules as heavier railroad demand pours in. One mill insists that the bar situation is now almost as bad as it is in other steel items. Even some defense orders of lower ranking than railroads are losing bar deliveries there. Shell steel is coming out more rapidly, new inquiry involving 60,000 tons probably will find 12,000 tons allocated to CHICAGO.

Bolts, Nuts and Rivets

... One department idle because of shortage

The cold heading department of one CLEVELAND plant was idle last Saturday because of a raw material shortage. Twelve to 14 hr. production was lost. Material arrived on that day but it was unknown in advance what sizes were coming. Cold drawn wire often is accepted instead of rods. Cap screw manufacturers report sales holding up at a high rate in excess of production. Users are specifying closer to actual needs.

Ickes Suggests Building Oil Tankers, $70 Million Pipe Line

Washington

• • • **Construction of** a $70,000,000 pipe line from East Texas oil fields to Atlantic seaboard and construction of 40 to 50 large tankers were recommended Tuesday by oil coordinator Ickes. The pipe line, of 20 and 24 in. pipe, will have a daily capacity of 250,000 barrels. The tankers will probably be built at Mobile, Ala. Building of the shipways and tankers, to be financed by the petroleum industry, will cost an estimated $150,000,000. Construction of the pipe line will take eight months under ideal conditions.

Sheet & Tube to Build New Furnace at Indiana Harbor

Youngstown

• • • **Youngstown Sheet & Tube** Co. will increase its ingot capacity through construction of a new open hearth at Indiana Harbor, Ind., and will make other improvements, according to announcement here this week. The program is in addition to the rebuilding of the Campbell mill and various other changes which were announced earlier this year. The new open hearth at Indiana Harbor will be No. 9 and will place raw steel capacity in better balance with hot mill needs.

Another strand will be added to the sintering plant at Indiana Harbor. A two-strand sintering plant will be erected at the Campbell Works. It is expected the work will be undertaken as quickly as possible and rushed to completion. The company is participating heavily in the national defense program.

New Inland Blast Furnace

Chicago

• • • **Inland Steel Co.** has entered into a tentative contract with Arthur G. McKee Co., Cleveland, for the construction of a blast furnace which will have a daily capacity of 1000 tons. This will make Inland's sixth blast furnace.

May Iron and Steel Exports Lowest Since April, 1940

• • • **May exports of iron** and steel from the United States totaled 409,840 gross tons, worth $35,346,239, the lowest level in 13 months, the Department of Commerce announced this week. April exports amounted to 515,657 tons, valued at $40,980,907. Non-alloy steel ingots, blooms, etc., amounting to 58,900 tons, composed the chief export item, comparing with 72,234 tons in April.

May scrap exports of 62,894 tons were little more than half the 120,152 ton April shipments, and only 20 per cent of the 310,870 tons exported in May, 1940. In line with its new policy announced last month, the department omitted mention of destinations of exports.

Export Ban Hits Axis Efforts In S.A.

Washington

• • • **Blacklisting by the** Administration of German and Italian agents and firms in South America threw new light this week on reports in THE IRON AGE a year ago that representatives of Nazi concerns were taking orders for steel and other products for fall delivery and giving bonds in some instances against the failure to make the promised deliveries.

The British blockade has prompted Axis agents to attempt establishment of small plants to produce goods formerly supplied by Germany.

The blacklisting was undertaken for several reasons, one of which is to curb these activities. The projected plants would compete with industries being developed with United States funds in South America, and would help Axis countries regain lost Latin America markets after the war.

The list, together with the accompanying executive orders, has the effect of freezing credits of these agents and firms in the United States and prohibits the direct or indirect exportation of any equipment, machinery, tools, or other material whose exportation outside the western hemisphere is already banned under the export licensing law.

Will Not Affect Exports

• • • **Blacklisting of** Latin American Axis firms is not expected to have any noticeable effect upon steel exports from the United States, according to leading exporters in New York. Practically all exporters have been guided for some time by the British blacklist which is understood to have formed the basis for the U. S. listings. Several small direct accounts and some small companies which had been importing finished metal articles represent the bulk of the companies which must be dropped due to blacklisting. In view of the enormous demand for steel from Latin America and the small tonnages which can be allocated for export, the blacklisting will not have any effect upon export volume.

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Awards jump to 39,950 tons from 11,150 tons last week; new projects higher at 30,300 tons; plate awards call for 4400 tons.

AWARDS

NORTH ATLANTIC STATES

3800 Tons, West Lynn, Mass., ship propulsion gear plant for General Electric Co., to American Bridge Co., Pittsburgh.

2500 Tons, Erie, Pa., General Electric Co., turbine shop No. 17, to Bethlehem Steel Co., Bethlehem, Pa.

2500 Tons, Niagara Falls, N. Y., addition for Bell Aircraft Corp., to Bethlehem Steel Co., Buffalo, through Austin Co., Cleveland.

1985 Tons, Dunkirk, N. Y., plant for Allegheny Ludlum Steel Corp., to Ingalls Iron Works Co., Birmingham.

1100 Tons, Bridgeport, Conn., addition to steel point station for United Illuminating Co., to American Bridge Co., Pittsburgh.

330 Tons, Paterson, N. J., Riverview Drive State grade crossing elimination, to American Bridge Co., Pittsburgh.

330 Tons, Ithaca, N. Y., Fall Creek bridge, to American Bridge Co., Pittsburgh.

310 Tons, Laurel Hill, N. Y., extension, wire bar department for Phelps-Dodge Mfg. Co., to American Bridge Co., Pittsburgh.

265 Tons, Washington, Maine Avenue underpass, to American Bridge Co., Pittsburgh.

200 Tons, Niagara Falls, N. Y., building No. 12, E. I. du Pont de Nemours & Co., Inc., to Ernst Iron Works, Buffalo.

130 Tons, Skowhegan, Me., State highway bridge, to American Bridge Co., Pittsburgh.

110 Tons, Ithaca, N. Y., East Clinton Street bridge, to American Bridge Co., Pittsburgh.

THE SOUTH

1500 Tons, Milan, Tenn., Wolf Creek ordnance plant, to Wisconsin Bridge & Iron Co., Milwaukee.

650 Tons, Talladega, Ala., bag manufacturing plant for ordnance bag loading plant, to Southern Steel Works Co., Birmingham.

327 Tons, Panama City, Fla., airplane hangar War Department, to Ingalls Iron Works Co., Birmingham.

323 Tons, Valparaiso,, Fla., airplane hangar for War Department, to Ingalls Iron Works Co., Birmingham.

110 Tons, Mulberry, Fla., dryer building for International Agricultural Corp., to Ingalls Iron Works Co., Birmingham.

106 Tons, Hinesville, Ga., ordnance shop for War Department, to Ingalls Iron Works Co., Birmingham.

CENTRAL STATES

7500 Tons, Minneapolis, Minn., Twin Cities ordnance plant, to Bethlehem Steel Co., Bethlehem, Pa.

7500 Tons, Des Moines, Iowa, ordnance plant, to Bethlehem Steel Co., Bethlehem, Pa.

2800 Tons, Chicago, East 79th Street pumping station, to American Bridge Co., Pittsburgh.

1030 Tons, Cleveland, forge shop, boiler house and machine shop for Champion Machine & Forging Co., to Burger Iron Co., Akron.

450 Tons, Indianapolis, boiler house for Defense Plant Corp., to American Bridge Co., Pittsburgh.

400 Tons, Painesville, Ohio, State grade separation, to American Bridge Co., Pittsburgh.

400 Tons, Euclid, Ohio, Chase Copper & Brass Co. plant, to American Bridge Co., Pittsburgh.

247 Tons, St. Paul, Minn., Forest Street bridge, State Highway Dept., to Bethlehem Steel Corp.

225 Tons, East Union, Ohio, Pennsylvania Railroad State bridge over route 30, to American Bridge Co., Pittsburgh.

216 Tons, Jeffersonville, Ind., factory building for Colgate-Palmolive-Peet Co., to R. C. Mahon Co., Detroit.

200 Tons, Dayton, Ill., La Salle County bridge, to American Bridge Co., Pittsburgh.

210 Tons, Chicago, bridge over 43rd Street, to American Bridge Co., Pittsburgh.

100 Tons, Cleveland, plate handling building for Republic Steel Corp., to Fort Pitt Bridge Works Co., Pittsburgh.

WESTERN STATES

1560 Tons, Ogden, Utah, three Army warehouses, to Kansas City Structural Steel Co., Kansas City, Kan.

415 Tons, Westland, Ore., six magazine buildings for Army, to Poole & McGonigle, Portland, Ore.

102 Tons, Denver, East 40th Avenue railroad overpass, to American Bridge Co., Pittsburgh.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

1300 Tons, Brooklyn, stock house for F. & M. Schaefer Brewing Co.

1100 Tons, Hopedale, Mass., building for Draper Corp.

375 Tons, New Bedford, Mass., roof trusses and beams, Invitation 699-41-6, Fort Rodman, for U. S. Engineers' office.

330 Tons, Newark, N. J., St. Michaels Hospital building.

255 Tons, Winslow, Me., Mile Brook State bridge.

240 Tons, Brooklyn, miscellaneous material, building No. 3 for Navy.

210 Tons, Brooklyn, substation and signal tower, route 49.

190 Tons, Old Lyme, Conn., Lieutenant River bridge for New York, New Haven & Hartford Railroad.

160 Tons, Wilmington, Del., burning and welding shop for Pusey & Jones Corp.

140 Tons, Chester, Pa., oven material for Philadelphia Electric Co.

THE SOUTH

175 Tons, Rivesville, W. Va., boiler supports for Monongahela Western Pennsylvania Public Service Co.

120 Tons, Raton, N. M., State highway and railway spans, FAGM-208-D (1).

CENTRAL STATES

3500 Tons, Toledo, Ohio, propeller plant for American Propeller Corp.

1500 Tons, Cleveland, forge and machine shop for Defense Plant Corp.

500 Tons, Cleveland, technical service building for government.

400 Tons, Wayne County, Mich., warehouse for General Motors Corp., diesel engine division.

320 Tons, Dayton, Ohio, supply warehouse, Wright Field, for U. S. Engineers.

205 Tons, Redfield, S. D., State bridge FAGM-95-F.

130 Tons, Cincinnati, fruit exchange building addition for Southern Railway Co.

Unstated Tonnage, Cleveland, technical service building for municipal airport.

WESTERN STATES

18,400 Tons, Bonneville, Ore., steel towers and appurtenances for Amper-North Bonneville, Midway-Coulee lines, and on Covington-Chehalis lines under Invitation 2069 Bonneville Power Adminstration; American Bridge Co., Pittsburgh, low bidder at $2,042,846.

200 Tons, Friant, Cal., gate frames and gates, river outlets, Friant Dam, for Bureau of Reclamation.

200 Tons, Weber River, Wyo., repairs, bridge No. 981.01 for Union Pacific Railroad Co.

150 Tons, Colorado, State highway bridges; bids July 29.

115 Tons, Coram, Cal., gate frames and anchorage, specification 1534-D, Shasta Dam, for Bureau of Reclamation.

FABRICATED PLATES

AWARDS

4400 Tons, Pittsburgh, 10 freight car floats for Pennsylvania Railroad, to Dravo Corp., Pittsburgh.

Weekly Bookings of Construction Steel

Week Ended ——→	July 22, 1941	July 15, 1941	June 24, 1941	July 23, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	39,950	11,150	27,500	29,925	870,010	474,880
Fabricated plate awards	4,400	3,000	3,025	3,450	92,415	82,475
Steel sheet piling awards	345	0	0	0	18,290	25,925
Reinforcing bar awards	5,650	11,310	13,255	12,225	350,255	245,785
Total Letting of Construction Steel	50,345	25,460	43,780	45,600	1,330,970	829,065

PENDING PROJECTS

200 **Tons,** Mellville, R. I., storage tank for Navy.

SHEET PILINGS

AWARDS

342 **Tons,** Paducah, Ky., flood protection, to Bethlehem Steel Co., Bethlehem, Pa.; Hoeffken Bros. Construction Co., and G. E. Tillman, Centralia, Ill., contractors.

Reinforcing Steel

Awards of 5650 tons; 24,925 tons in new projects.

AWARDS

ATLANTIC STATES

2500 **Tons,** Portland, Me., Navy dock, to Youngstown Sheet & Tube Co., Youngstown.

425 **Tons,** Philadelphia, warehouse substructure for Philadelphia Navy Yard, to Truscon Steel Co., Youngstown, through Golden Construction Co.

160 **Tons,** Rochester, N. Y., St. Mary's Hospital, to Bethlehem Steel Co., Bethlehem, Pa.; Daniel J. Meagher, contractor.

100 **Tons,** Boston, Bird Street bridge, to Northern Steel Co., Boston; Coleman Brothers, contractors.

SOUTH AND CENTRAL

200 **Tons,** Fort Crook, Neb., U. S. Engineer office, invitation 643-41-225, to Sheffield Steel Corp., Kansas City.

160 **Tons,** Wyandotte, Mich., plant for Michigan Alkali Co., to Truscon Steel Co., Youngstown.

150 **Tons,** Indianapolis, Naval ordnance plant, to Republic Steel Corp., Cleveland.

120 **Tons,** Norfolk County, Va., overpass, route 58, to Virginia Steel Co., Roanoke, Va.; W. N. Jackson, contractor.

113 **Tons,** Barber, Kan., highway project FAS-144-A, to Sheffield Steel Corp., Kansas City.

110 **Tons,** Little Rock, Ark., overpass, to Jones & Laughlin Steel Co., Pittsburgh.

106 **Tons,** Quantico, Va., work at Marine Barracks, to Truscon Steel Co., Youngstown, through Hardwood Nebel Construction Co.

100 **Tons,** Great Lakes, Ill., administration building, Naval training station, to Jos. T. Ryerson & Son, Inc., Chicago.

100 **Tons,** Kansas City, Mo., quartermaster depot, clothes renovation plant, to Sheffield Steel Corp., Kansas City, through Universal Construction Co., contractor.

WESTERN STATES

900 **Tons,** San Diego, Cal., reconditioning pier at Naval Destroyer Base, to Soule Steel Co., Los Angeles.

235 **Tons,** Humboldt County, Cal., Eureka Slough highway bridge project, to Soule Steel Co., San Francisco.

160 **Tons,** Mancos, Colo., Bureau of Reclamation, invitation 17007, to Sheffield Steel Corp., Kansas City.

PENDING STRUCTURAL STEEL PROJECTS

ATLANTIC STATES

10,000 **Tons,** Seneca Falls, N. Y., ammunition depot.

10,000 **Tons,** Rome, N. Y., Army air base.

650 **Tons,** Buffalo, addition to Standard Milling Co. elevator; McKenzie-Hauge Co., Minneapolis, constructing and Designing engineer.

150 **Tons,** Hopedale, Mass., Draper Corp. plant.

2000 **Tons,** Oklahoma City, Okla., Army base.

850 **Tons,** Wright Field, Ohio, propeller laboratory and test stand; Ferro Concrete Construction Co., contractor.

400 **Tons,** Patterson Field, Ohio, engine test stand building addition; Charles H. Shook, contractor.

150 **Tons,** Chicago, subway, section T-1; bids July 24.

WESTERN STATES

450 **Tons,** Wilmington, Cal., steam plant for Los Angeles Bureau of Power and Light.

325 **Tons,** San Diego, Cal., storehouse at Naval Supply Depot.

275 **Tons,** Los Angeles, office building for State Division of Highways.

209 **Tons,** King County, Wash., seven State highway bridges; bids July 29.

113 **Tons,** San Diego County, Cal., two County highway bridges; bids taken.

Cast Iron Pipe

• **Brattleboro, Vt.,** has placed about three miles of 10-in. pipe with R. D. Wood & Co.

War Department for Boston harbor water mains to camps and forts has placed about 100 tons of 6 and 8-in. pipe with Warren Foundry & Pipe Corp.

Waterville, Me., has purchased 1500 tons of 16-in. pipe from R. D. Wood & Co. for a Kennebec Water District project.

Concord, N. C., asks bids until Aug. 14 for 7000 ft. of 12 to 18-in. pipe for extensions and replacements in main water lines; also for 100,000-gal. elevated steel tank and tower; 6,000,000-gal. filter plant; and 2,000,000-gal. concrete reservoir. Gilbert C. White Co., Durham, N. C., is consulting engineer.

Water Department, Toledo, Ohio, plans extensions in main water lines in northwestern part of city. Cost about $100,000. Financing will be arranged through Federal aid.

Mission Township Commissioners, Johnson County, Kan., care of Shockley Engineering Co., Graphic Arts Building, Kansas City, Mo., consulting engineer, plans pipe lines for water system in parts of Mission and Shawnee Townships, and other waterworks installation. Cost over $800,000.

Water Department, San Diego, Cal., plans to begin work by close of year on three miles of 42-in. pipe for main line to Murray reservoir. Cost about $250,000. This is part of water expansion and improvement program to be carried out by city, and for which bond issue of $1,300,000 has been authorized. Fred D. Pyle is city hydraulic engineer in charge.

Orting, Wash., plans pipe line extensions and improvements in water system, and other waterworks installation. Surveys and estimates of cost are being made by Parker & Hill, Smith Tower Building, Seattle, consulting engineers.

Waynesfield, Ohio, plans pipe line extensions and improvements in water system; also new elevated steel tank and tower, and other waterworks installation. Cost about $50,000. Ellis & Wertz, 122 East Main Street, Van Wert, Ohio, are consulting engineers.

Sewerage and Water Board, New Orleans, asks bids until July 28 for pipe for extensions in water system.

Pipe Lines

• **West Virginia Gas Corp.,** Union Trust Building, Charleston, W. Va., plans welded steel pipe line from Grapevine Creek and neighboring gas fields in Lincoln County to Huntington, W. Va., and vicinity, for natural gas transmission for supply to industrial plants in latter district, where control house and meter station will be located. Cost estimated at $200,000.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans pressure pipe line from gas-making plant to Thirtieth and Davenport Streets, for gas transmission. Cost close to $115,000.

Gulf Oil Corp., Gulf Building, Pittsburgh, has let following contracts for extensions in main welded steel pipe line for crude oil transmission from Glenpool, near Jenks, Okla., to Dublin, Ind., consisting of 13 new loops of 10¾-in. pipe, about 202 miles, total: Williams Brothers Corp., National Bank of Tulsa Building, Tulsa, Okla., three loops in Oklahoma; Jones & Brooks, Inc., 7 West Eighteenth Street, Tulsa, six loops in Illinois and Indiana; and to B. & M. Construction Co., Petroleum Building, Oklahoma City, four loops in Missouri. Contract for pipe has previously been awarded. Booster stations will be installed. Work will be carried out under direction of Gulf Pipe Line Co., a subsidiary.

Bell Oil & Gas Co., Tulsa, Okla., plans 4-in. welded steel pipe line from Fargo oil field, Wilbarger County, northern Texas, to Grandfield, Okla., about 35 miles, for crude oil transmission to company refinery at latter place. Booster pumping station is planned.

Consumers Power Co., Jackson, Mich., has secured permission for furnishing natural gas to 66 communities in State now using artificial gas, and also approval of a 15-year contract for natural gas supply with Panhandle Eastern Pipe Line Co., 101 West Eleventh Street, Kansas City, Mo. Both companies will begin work on project recently noted in these columns. Consumers company plans about 130 miles of welded steel pipe lines to Jackson, Kalamazoo, Flint, Birmingham, Mount Clemens and other points for main gas transmission from connection with lines of Panhandle company, with laterals for service in nearby smaller municipalities; also will build control stations and meter houses, and make changes and modifications in present distribution lines for new service. Cost over $4,500,000 instead of smaller sum previously noted, due to expansion in territory to be served. Panhandle company will build about 400 miles of welded steel pipe lines for main supply; of this total, approximately 200 miles will be constructed in different parts of Michigan for connection with Consumers Power Co. lines; another 200 miles of new pipe lines will be installed for loops and other expansion in main gas transmission system from Texas Panhandle area to present terminus near Detroit, with booster stations and other operating facilities. Cost about $9,000,000.

United Gas Pipe Line Co., Shreveport, La., has authorized extensions in main welded steel pipe lines for natural gas transmission, to include three 10-in. lines under and across Mississippi River, near St. Rose, La.

New Chlorinated Chemical Plant for Michigan

Detroit

• • • **A new plant for** the manufacture of chlorinated chemical specialties will be erected soon on a 22-acre site at Wyandotte, Mich., in the river front purchased recently by E. I. du Pont de Nemours & Co. It will be operated by the R and H Chemicals Department of Du Pont.

There is reported an increasingly great demand for chlorinated solvents for use in the automobile and defense industries and it is believed that this plant will be rushed to completion to help meet the demand.

Treasury Prepares Alternate Standards on Materials

Washington

• • • **Emergency alternate** specifications to existing standards federal specifications are being prepared by the Treasury Department's Procurement Division in an effort to conserve certain materials in which acute shortages exist. Procurement Director Clifton E. Mack said that the emergency alternate specifications, drawn in collaboration with the OPM, are for those non-military items in general federal use in which one or more strategic materials are utilized.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Material Restrictions Threaten

Cincinnati

• • • **While no material** famine has yet arrived or appears likely in the immediate future, machinery manufacturers are becoming concerned over anticipated restrictions in needed items. They indicate, however, that so far there has been no serious cramping, although in a few instances, materials have arrived just in time to go into immediate manufacture. In other instances, manufacturers have contracts of long standing, with material suppliers and these are being well fulfilled, but they are expressing some concern over their problem when these contracts expire.

New business is reported to be undiminished and the potential business continues to be large. Plants are extending themselves to a limit to keep deliveries moving and all methods of pressing production are being employed.

Tools for Bomber Program

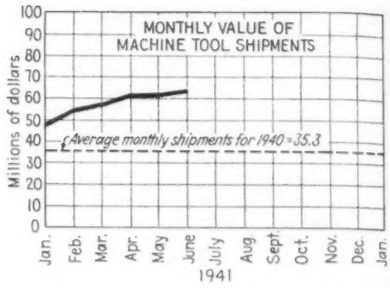
Cleveland

• • • **The highlight of** July has been the receipt of very definite orders for the new bomber program. Much additional business is expected in connection with this program, from engine makers, manufacturers of landing gear and plane parts.

The new priority set-up embodies a number of important changes. Machine tool builders are placed in two classes. Another important recent development has been the master preference list of government projects.

Maladjustments which are bound to occur on such a large program continue to rise and center principally around the need for accurate required delivery dates. In one instance machines were shipped 1½ months before the original delivery promise and four months before they were put to use.

While the Russians can get export licenses and are anxious to obtain around $14,000,000 in machines which have long been sought, plus $56,000,000 in equipment for airplane engine plants, the fact is that much of the equipment involves critical machines. The Russians will obtain machinery for an oil refinery program.

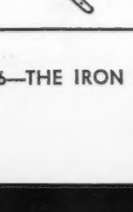


MACHINE tool shipments for June increased to $63,400,000 as compared to $60,800,000 for May of this year and $34,000,000 for June, 1940, according to the National Machine Tool Builders' Association. The industry has practically doubled its rate of production in the last year. About 95 per cent of the employees in the industry are employed in companies working two or three shifts, subcontracting is steadily increasing and training programs for new workers are in full swing. According to present indications, the industry will meet or exceed its announced goal of a total production of $750,000,000 for 1941. Shipments for the first six months approximated $345,000,000, but are steadily rising.

the practical side of Springmaking—BY DUNBAR

We Fix Flats (SPRINGS)

Limited technical information can be given about flat springs because of the infinite number of shapes that can be utilized. Your springmaker (us, we hope) can supply a fund of experience from past performances. Heat treating and getting flat springs through the heat treating process without vexing distortions is the springmaker's province. "You dream it and we'll do it" seems to be the appropriate message.



Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

"Quality Springs since 1845"

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

Scrap Brass Price Ceiling Set—M.R.C. Buys Foreign Lead

New York

• • • **Establishment of** ceiling prices on scrap brass; the purchase of 225,000 tons of Canadian and Mexican lead by Metals Reserve Co. and government-industry discussions on increasing copper production were the main features in the non-ferrous market during the past week.

The scrap brass price schedule, issued Monday, is the twelfth price schedule to be issued by OPACS. Top prices on heavy scrap under the new ceiling range from 9½c., per lb., for commercial bronze containing 95 per cent or more copper, to 8⅝c., per lb., for yellow brass. Rod ends and turnings scale downward from the heavy scrap price ceiling. Premiums of ⅝c. are allowed for lot shipments of 15,000 lb. or more, and 1c. is allowed for lot shipments of 40,000 lb. or more. Prices are F.O.B. point of shipment.

Arrangements for the purchase during the last half of 1941 of 225,000 short tons of Canadian and Mexican lead were announced last week. The purchase of Peruvian lead is still being negotiated. Metals Reserve Co. will distribute the lead through allocations from OPM at domestic lead prices. OPM issued a statement that, while this lead will be sold to consumers, no applications for allocations will be considered until the consumers have exhausted usual methods of obtaining metal from their suppliers.

The problem of increasing copper production, discussed in Washington last week by OPM, OPACS, and industry officials, is believed to be now down to how much the individual producers are to be paid for extraordinary production efforts. It is indicated that the government officials will now have to take up this matter with the individual producers.

The zinc situation is very tight, with consumers finding it increasingly more difficult to get needed supplies. Discontinuance of the OPM and zinc industry committee meetings before the establishment of the new Commodity Branch and Industry Committee slowed down allocations from the pool, and some producers are only now receiving July releases.

Consolidated Mining and Smelting Co. of Canada, will start smelting tin at their refinery at Trail, British Columbia, using ores from their Sullivan Mine, at Kimberley, British Columbia. While these are low grade ores, a recovery process has been recently developed for treating accumulated residues. Production will be 40 to 50 tons a month.

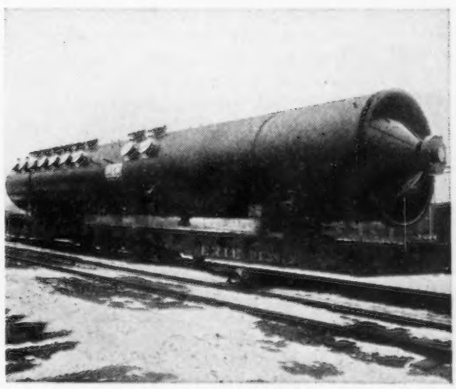
Pricewise, there has been little change in the non-ferrous market. Lead prices held at 5.70c., St. Louis, and 5.85c. a lb., New York, while copper mine interests were quoting 12c. a lb., Connecticut Valley, and custom smelters 12.50c. Zinc prices were unchanged at 7.25c., East St. Louis and 6.65c. a lb. at New York. The tin market was dull all week and prices reached a peak Tuesday of 53.75c. a lb., New York.

(Non-ferrous prices appear on page 111.)

"Right the first time ...and right on time!"

It's a 49-year tradition here at Sharon to deliver each order on schedule and exactly as specified. You can place your steel fabricating jobs with us in complete confidence. The resources of General American Transportation Corporation, joined with the steel skill of the veteran personnel taken over intact from P. I. W., assure unsurpassed service on pressure vessels, storage tanks, and other riveted or welded steel equipment.

GATX GENERAL AMERICAN PLATE & WELDING DIVISION PLANT AT SHARON, PA.



"FLUID FUSION" WELDED VESSELS are now made EXCLUSIVELY by

PLATE AND WELDING DIVISION
GENERAL AMERICAN TRANSPORTATION CORP.
Successor to Plate & Welding Div., Petroleum Iron Works Co. (P. I. W.)

Plant at Sharon, Pa.
Offices in All Principal Cities

Steel Output Slowed By Scrap Tightness

• • • **Tightness of scrap** supplies and overgrading are responsible for a loss of an estimated 50,000 tons of ingots a month in the Pittsburgh area, it is indicated by a survey of the scrap situation by THE IRON AGE. While no actual curtailment of furnace operations is reported in any district yet, many furnaces are not producing at full capacity due to inability to obtain proper grades of scrap, and other conditions caused by the tightness of supplies.

Actual curtailment of steel making is predicted within the next 60 days, due to lack of scrap, if the present flow of material to steel mills is not sharply increased, it was indicated by the survey. Shortage of foundry scrap is reported especially severe. In districts where incoming shipments are balancing consumption, acute concern is expressed over inability to build up inventories against winter months when processing and shipment of scrap are hindered by the weather.

Pittsburgh

• • • **Few, if any, open-hearth** furnaces in this district have shut down because of a scrap shortage, but there is specific evidence that production of steel in furnaces now in operation has been curtailed due to insufficient quantities of primary scrap grades. Lack of sufficient No. 1 heavy melting steel has forced the use of inferior grades, with the result that less steel is being produced than would be if primary grades were available in sufficient quantities. Inventories at some plants are as low as two days to a week's supply.

For the past several weeks, steel ingot operations at Pittsburgh have been less than 100 per cent, whereas a few months ago the rate actually reached 103 per cent and was maintained for several weeks at more than 100 per cent. This would indicate that although abnormal furnace repairs may be partly responsible for the present level, there is enough evidence to indicate lack of sufficient scrap or the use of less desirable grades has forced the district to produce at a rate approximately three points below what it should be. Converting this into actual tons would indicate that approximately 50,000 tons of steel a month will be lost to the Pittsburgh district as long as the rate continues to be three points below the maximum level reached a few months ago.

Cleveland

• • • **In Ohio** THE IRON AGE survey shows steel plants gradually coming closer to the point where production losses can be expected—particularly in the Youngstown, Warren, Canton, Massillon areas. One central Ohio mill, using around 13,000 tons per month, had only 600 tons in its stock pile late last week. At Cleveland, principal mills seemed a little more comfortably fixed than the plants of southern, central and eastern Ohio.

So far as is known here no actual curtailment of foundry operations has resulted yet from the scrap shortage, but there has been a number of instances where only prompt emergency action averted shut-downs.

Chicago

• • • **No loss in steel** production due to scrap shortage has been experienced to date by mills in this district. Howevery, producers express fears that losses may be suffered in the third quarter if present conditions continue. At the present time practically all mills are dipping into scrap inventories at a period when stocks are normally built up for the winter months.

Philadelphia

• • • **Several thousand tons** of scrap originally intended for export have been diverted to a local mill under instructions of OPM in order to avoid a threatened closure of the mill this week due to lack of scrap. The situation generally is reported closing to the breaking point, with one mill working on a day to day basis.

Buffalo

• • • **Steel production here** has not yet been affected by tightness in scrap, but no local mill is able to make any headway in building up reserves to carry over the winter months. Foundrymen are especially concerned over prospects of entering winter season without reserves.

Birmingham

• • • **Steel production** of the two largest mills here has not been affected by the scrap shortage, but a spokesman for one company said "a tonnage loss will be caused in a month or two if scrap stocks continue depleting as they have for the past five or six weeks."

Production by a smaller Alabama steel company using a special grade of scrap has been curtailed with an undisclosed tonnage loss and a more drastic curtailment threatens this company if inability to obtain scrap supplies continues. A fourth company reports "We have no trouble getting all the scrap we need."

St. Louis

• • • **None of the steel** mills in the St. Louis district checked by THE IRON AGE reported any steel tonnage loss because of the shortage of scrap. One steel mill in the district said that unless there was an increase in the receipt of scrap within the next two or three weeks, there might be a tonnage loss, while others reported they felt no concern for their third quarter requirements.

Cincinnati

• • • **While there is** no definite curtailment of steel production in the Southern Ohio district due to scrap tightness, the industry is unanimous that unless a change is forthcoming quickly the next 30 days will see a reduction in steel output. Scrap piles are estimated to be large enough for two weeks to 45 days' operations.

Scrap Price Problem To Test OPACS Power

• • • **The numerous difficulties** surrounding government efforts at price stabiliization are highlighted by the current scrap steel situation. While stressing the desirability of stabilization during the national emergency, responsible scrap trade interests point out that the scrap stabilization effort over the past two weeks has reached a point where unless intelligent and forceful steps are immediately taken, the price problem will deteriorate to a point where both production and prices of finished steel will be endangered.

The authority and ability of OPACS to stabilize scrap prices are currently receiving their first test and in some instances have been found wanting. The test has arisen not through any desire of the trade to fight intelligent stabilization, but rather through the failure of OPACS to heed the constructive suggestions of trade authorities versed in the complexities of the industry. Scrap dealers are now in a position best described as "be damned if they do and be damned if they don't."

Rising above all the mystery and confusion surrounding the scrap question is the definite fact that many consumers are actually paying more for scrap than is authorized by OPACS. This is particularly true in the East, where large tonnages were booked a week or so ago at prices averaging about $1 above the area's ceilings. At present prices in New York are nominally back at the official ceiling, but the bulk of the supplies which will be available for some time to come in that area have been tied up at prices above the maximums.

Another factor resulting in higher scrap costs is the growth of undergrading, typified by appearance in the East of the specification "light No. 1 melting steel." It is estimated by an Ohio consumer that No. 1 heavy melting steel today is about $2 above the level of two months ago, taking into consideration the type of material being accepted today as No. 1 steel. A general relaxation of the spiritual observation of OPACS regulations (while adhering to technical interpretations) is reported from practically all districts.

The gravity of the situation lies in the fact that stabilization if not strictly enforced is worse than a market without any restraint under today's condition. Without enforcement, there is bound to develop among smaller interests a tendency to withhold scrap in hopes of benefiting pricewise from the sporadic excursions from the ceiling prices. To permit this to develop, in view of the already extremely grave supply picture, as disclosed in THE IRON AGE survey published in this issue, would be to court a serious hamstringing of the defense program through forcing curtailment of steel ingot production.

Maximum Iron and Steel Scrap Prices

As Revised by OPACS to June 25, 1941

SCHEDULE A

Iron and Steel Scrap, other than Railroad Scrap

(Basing point prices from which shipping point prices and consumers' delivered prices are to be computed—Dollars per gross ton)

GRADES \ Basing Points	Pittsburgh Johnstown, Pa. Weirton, W. Va. Steubenville, O. Youngstown Warren, O. Sharon, Pa. Canton, O.	Chicago	Kokomo, Ind.	Bethlehem, Pa. Claymont, Del. Coatesville, Pa. Phoenixville, Pa. Harrisburg	Sparrows Point, Md.	Buffalo	Cleveland	Toledo, Ohio	Portsmouth, Ohio Middletown, Ohio Ashland, Ky.	St. Louis	Detroit	Duluth	Birmingham, Ala.	Chattanooga, Tenn.	Radford, Va.	Worcester, Mass. Bridgeport, Conn. Phillipsdale, R. I.	Los Angeles San Francisco Seattle	Minnequa, Colo.
No. 1 heavy melting	20.00	18.75	18.25	18.25	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 1 hydraulic compressed black sheet	20.00	18.75	18.25	18.25	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	14.50	16.50
No. 2 heavy melting	19.00	17.75	17.25	17.25	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
Dealers' No. 1 bundles	19.00	17.75	17.25	17.25	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	13.50	15.50
Dealers' No. 2 bundles	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	12.50	14.50
Mixed borings and turnings	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	.....	14.75	12.75	13.10	.....	12.25	.....	.....	9.75	11.75
Machine shop turnings	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	15.50	15.00	Alloy, W. Va. 17.60	.....	10.00	12.00
Shoveling turnings	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	.....	16.00	14.00	14.35	16.50	.....	.....	.....	11.00	13.00
No. 1 busheling	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.50	.....	.....	14.00	16.00
No. 2 busheling	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	10.00	12.00
Cast iron borings	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	.....	[6]15.00	13.25	13.60	13.75	12.75	.....	.....	10.25	12.25
Uncut structural and plate scrap	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	18.50	16.85	17.00	16.00	.....	.....	13.50	15.50
No. 1 cupola	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	18.00	20.00	20.50	21.00	22.00	18.00	.....
Heavy breakable cast	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	16.50	18.50	.....	.....	20.50	17.00	.....
Stove plate	[5]19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	.....	17.00	17.50	18.00	14.00	14.00	11.25
Low phos. billet and bloom crops	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	.....	.....
Low phos. bar crops and smaller	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....
Low phos. punchings and plate scrap [1]	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....
Machinery cast, cupola size [2]	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	19.00	21.00	21.50	22.00	23.00	19.00	.....
No. 1 mach. cast, drop-broken, 150 lbs. and under	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	.....
Clean auto cast	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	19.50	21.50	22.00	22.50	23.50	19.50	.....
Punchings and plate scrap [3]	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20.00	19.00	.....	.....	.....	.....	.....
Punchings and plate scrap [4]	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	.....	.....
Heavy axle and forge turnings	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	14.00	.....
Medium heavy electric furnace turnings	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	12.50	.....

(See footnotes)

[1] This grade is ⅜-in. and heavier, cut 12 in. and under.
[2] May include clean agricultural cast.
[3] Under ⅜ to ¼-in., cut 12 in. and under.
[4] Under ¼-in. to No. 12 gage, cut 12 in. and under.
[5] Youngstown, Warren, Sharon and Canton are not basing points on this grade.
[6] Portsmouth, Ohio, price for this grade is $15.25. Ashland, Ky., is not a basing point for this item.

SCHEDULE B

Railroad Scrap

(Delivered Consumers' Plants Located on Line of Railroad Originating Scrap—Per Gross Ton)

GRADES \ Basing Points	Pittsburgh Sharon, Pa. Wheeling, W. Va. Steubenville, O. Youngstown Canton, O.	Chicago	Kokomo, Ind.	Philadelphia	Wilmington, Del.	Sparrows Point	Cleveland	Buffalo	Portsmouth, O. Middletown, O. Ashland, Ky.	St. Louis	Kansas City	Detroit	Duluth	Birmingham, Ala.	Los Angeles San Francisco Seattle	Minnequa, Colo.
No. 1 heavy melting	$21.00	$19.75	$19.25	$19.75	$19.75	$19.75	$20.50	$20.25	$20.50	$18.50	$17.00	$18.85	$19.00	$18.00	$15.50	$17.50
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	19.85	20.00	19.00	16.50	18.50
Rerolling rails*	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	21.35	21.50	20.50	18.00	20.00
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	21.85	22.00	21.00	18.50	20.50
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	22.10	22.25	21.25	18.75	20.75
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	22.35	22.50	21.50	19.00	21.00

* Relaying quality $5 higher.

Where the railroad originator of the scrap operates in two or more of the basing points named in Schedule B, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that Chicago consumers of scrap originating from railroads operating in Chicago are permitted to pay as much as 84c. a gross ton in switching charges above the maxima.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than $1 prices in Schedule A for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which scrap is to be shipped to consumer and is calculated by subtracting the lowest established charge for transporting scrap from the shipping point to the nearest basing point. The following are exceptions: The shipping point price at any shipping point in New England, of those grades for which no prices are listed at the basing points established for New England, shall be the Johnstown basing point price, minus all-rail transportation costs from the New England shipping point to Johnstown. However, the shipping point price at any shipping point in New England of those grades of scrap for which prices are listed at the basing points in New England shall be computed from those New England basing point prices.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is $11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is $2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than $2.50 in transportation charges. Lowest established transportation charges will govern.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extas, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / ↓ Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes [2]	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ [10]			
TERNES, MFG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel [6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES											(Coatesville and Claymont = 2.10¢)				
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ [11]		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE [9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only. 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] Boxed. [11] Ship plates only.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pitsburgh Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	65½
9/16 and ⅝ in. by 6 in. and shorter	63½
¾ to 1 in. by 6 in. and shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65
Nuts, cold punched or hot pressed, hex. or square:	
½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk 80

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pitsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws *Per Cent Off List*

Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap screws, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	July 16	July 17	July 18	July 19	July 21	July 22
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York[2]	53.25	53.25	53.375	....	53.50	53.75
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.70	5.70	5.70	5.70	5.70	5.70

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits, pig	54.50	55.00
Copper		
Electro	13.00	13.25
Castings	12.50	13.15
H. R. Sheets*	20.87	20.87
Seamless tubes*	21.37	21.37
Brass		
Yellow sheets*	19.48	19.48
Yellow, rods*	15.01	15.01
Seamless tubes*	22.23	22.23
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	91.0
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt, 98-99%	18.00	18.50
Solder		
½ and ½	33.00	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	11.125	11.75
Hvy. and wire	10.125	10.625
Light and bottoms	8.875	9.375
Brass		
Heavy	6.50	7.00
Light	5.25	6.00
No. 1 yel. turn	6.25	6.75
No. 1 red or compo. turnings	9.75	10.75
Hvy. Mach. compo.	10.00	10.25
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00	12.00
Sheet	12.00	13.50
Zinc	....	5.10

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $190, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade .....2.70c.
Delivered, Detroit .....2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
C-V	0.85
6100 Cr-V spring steel	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

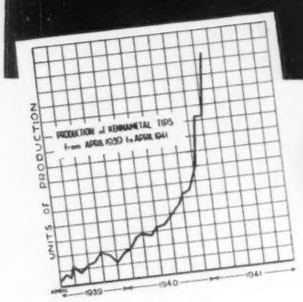
Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade .....3.50c.

KENNAMETAL TOOLS PERMIT 60 TIMES MORE PRODUCTION

per Pound of Tungsten used

The tungsten in KENNAMETAL tools is concentrated entirely in the tungsten-titanium carbide tip. There is no tungsten in the shank of the tool.



The importance of tungsten to National Defense is emphasized by the fact that this strategic war material has been placed on the priority list.

But not only is it important to conserve our available tungsten supply for defense production—it is also necessary to get the most efficient use from this tungsten after it is put to work.

KENNAMETAL tools afford a startlingly effective means of getting the greatest production from the tungsten used in turning, boring, facing, and shaping steel and other metals. In the first place, the tungsten in these tools is concentrated entirely in the KENNAMETAL tip—at the point of the tool where it is actually needed to cut metal; whereas "18-4-1" high speed steel tools have their 18% tungsten dispersed throughout the body of the tool. In the second place, KENNAMETAL is so hard (78 Rockwell C for grade KH as compared to 67 Rockwell C for the hardest high speed steel), that tools tipped with this hard carbide remove three to ten times more metal per grind of tool than do high speed steel tools. By utilizing tungsten in its hardest form, exactly where needed, KENNAMETAL tools produce 60 times more work per pound of tungsten used.

Plant executives who are interested in conserving the Nation's tungsten supply—while greatly increasing machine shop production—are urged to investigate KENNAMETAL without delay. Send for descriptive folder—no cost or obligation.

McKENNA METALS Co.
144 LLOYD AVENUE, LATROBE, PENNA.
FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO.
(Exclusive of Canada, Great Britain and Possessions)

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37,35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = $200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	33
¼ to ⅜ in.	59	40½
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron		
¼ and ⅜ in.	+9	+33
½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Lap Weld

Steel		
2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½
7 and 8 in.	65	52½
9 and 10 in.	64½	52
11 and 12 in.	63½	51
Wrought Iron		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
9 to 12 in.	38½	12

Butt weld, extra strong, plain ends

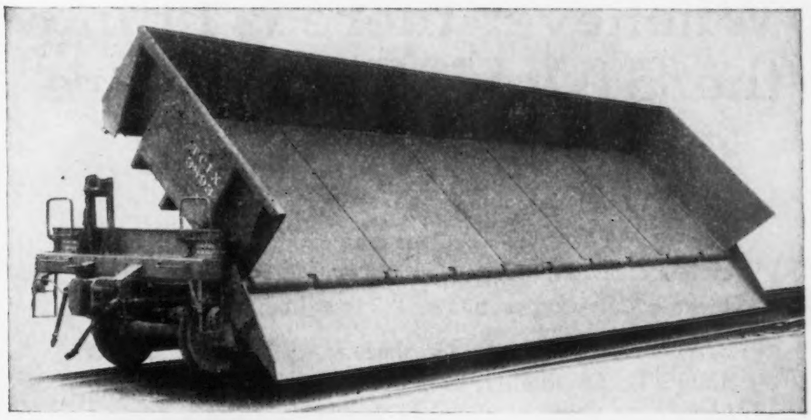
Steel	Black	Galv.
⅛ in.	54½	38½
¼ to ⅜ in.	56½	42½
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron		
¼ and ⅜ in.	+10	+46
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
7 and 8 in.	65½	53
9 and 10 in.	64½	52
11 and 12 in.	63½	51
Wrought Iron		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21
7 and 8 in.	38½	21½
9 to 12 in.	32	17½

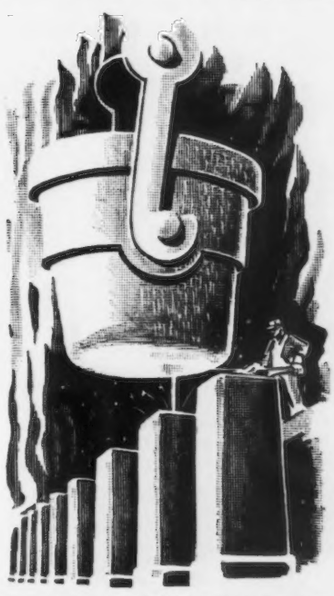
On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.



Get
THE INTERESTING
COST FIGURES
ON THESE
INDUSTRIAL
WASTE DISPOSAL
CARS

INCREASED EFFICIENCY 60%



Increased waste disposal efficiency 60%; reduced initial cost 27% . . . these savings were proved in service with the Koppel 50 yd. Automatic Air Dump Car. Similar savings can be yours on bulk disposal of waste materials and other equally effective savings can be made throughout your plant with proper use of some of the 75 other types of Koppel industrial cars. ◐ Let us show you these cost figures and prove that the "Koppel way" is the saving way.

KOPPEL

PRESSED STEEL CAR COMPANY, INC.
(KOPPEL DIVISION)
PITTSBURGH, PENNSYLVANIA

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Grosss Ton

Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn.	61c. to 65c.
African, Indian, 49 to 51% Mn.	71c. to 72c.
Brazilian, 46 to 48% Mn.	69c to 70c.
Cuban, del'd, duty free, 51% Mn.	.....

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....	$24 to $25
Tungsten, domestic, scheelite, delivered	$24 to $25
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton; South Cuban, 32%	$18.00
Indian, 48-50%	$38 to $40
Rhodesian, 48%	$35 to $40

Whenever there is lifting the SAVING words are "Shaw-Box"

The words "SHAW-BOX" are on small hand-operated cranes of 500 lb. lifting capacity. You may read them on Electric Traveling cranes of 450 tons lifting capacity.

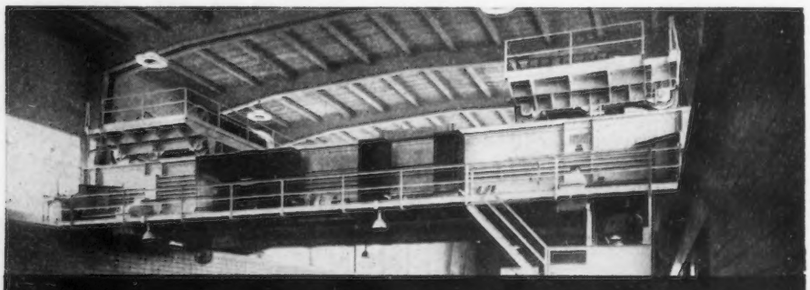
Wherever you see them, there is efficient economical lifting. For in addition to good, basic designs, there are features in Shaw-Box Cranes that make them the latest word in modern crane engineering.

Send for catalog with complete information, illustrations, dimensions and specifications.

Note these 8 features of the TYPE S SHAW-BOX CRANE

- All Steel "ShaWeld" Construction
- Anti-friction Bearings
- Direct Bridge Drive
- Rotating Wheel Axles
- Taper Tread Wheels
- "ShaWeld" Gears
- Hydraulic Bridge Brake
- Oil bath operation of all parts

In no other crane could you get all these or enough of them to compare — yet you pay no premium for Shaw-Box features. Let us quote on all your crane requirements.



SHAW-BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton.....	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.75c.
Track bolts, discount to jobbers all sizes (per 100 counts)....	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....	$21.00
Domestic, f.o.b. Ohio River landing barges	21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines.....	21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid.....Nominal	
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick *Per 1000 f.o.b. Works*

Super-duty brick at St. Louis..	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey.....	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri, and Illinois	46.55
Second quality, New Jersey....	51.00
No. 1 Ohio.....	43.00
Ground fire clay, per ton.....	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick *Net per Ton*

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	$54.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks.....	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00
Domestic, 78-82%, carlots, f.o.b. Tennessee furnaces 145.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk)....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, Silicon 6.00 to 6.50%

Jackson, Ohio $29.50*
Buffalo, N. Y. 30.75*

For each additional 0.25% silicon up to 10%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Manganese, each 0.50% over 1%, 50c. a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

*Official maximum prices established by OPACS on June 25.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C. f.o.b. furnace carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C. f.o.b. furnace, carload and contract per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24% per gross ton, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo., f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.
Molybdenum oxide, in cans, per lb. of contained Mo, f.o.b. Washington, Pa. ..... 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.90c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..6.25c.
No. 4 indus., del'd Cleveland....5.75c.
No. 5 indus., del'd Cleveland...5.375c.
No. 6 indus., del'd Cleveland...5.00c.

REPEL THE FRICTION INVADERS!

ALL-OUT arms output demands Steel...and *more* Steel! Here is the *real* first line of defense! It's 24-hours-a-day for man and machine in America's mills...*with Friction their deadliest enemy!*

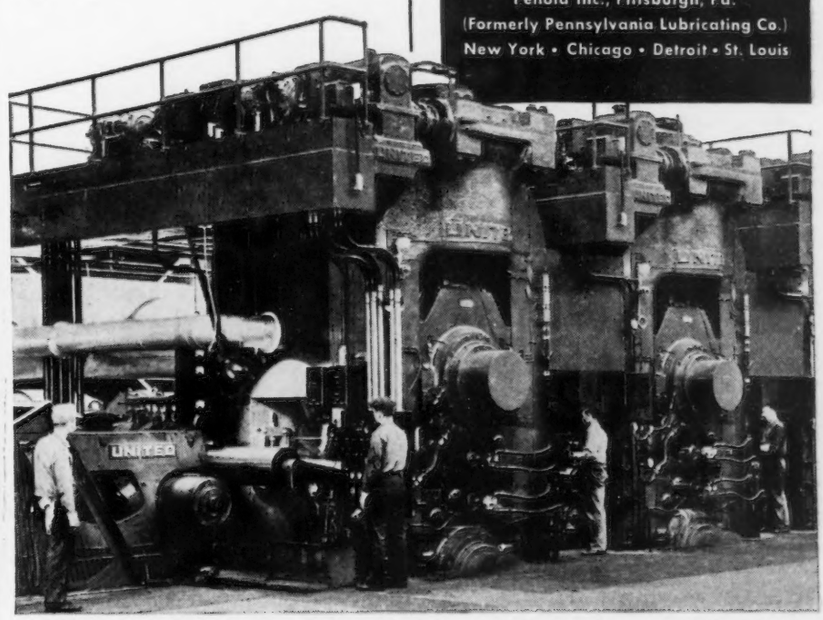
When bearings costing $10,000 are called on to withstand pressures up to *five million pounds per bearing*... it takes mighty tough lubricants to stave off devastating metal-to-metal contact.

In the majority of 4-high mills, steel men depend on friction-fighting Penola lubricants to see their big defense orders through safely...and on time.

Penola lubricants are made to stand up under any conditions that actual mill operations may impose. No steel man could ask for more assurance than that!

Be sure of that safety margin. Don't let Friction sabotage *your* machines. Call in a capable Penola engineer TODAY!

PENOLA LUBRICANTS
Penola Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Co.)
New York • Chicago • Detroit • St. Louis



LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$6.00 to $6.25

Foundry, f.o.b. Connellsville, prompt .....$6.75 to $7.00

F'dry, by-product, Chicago..... 10.50

F'dry, by-Product, New England 13.75

Foundry, by-product, Newark or Jersey City .....$12.45 to 12.95

F'dry, by-product, Philadelphia. 12.13

F'dry, by-product, Cleveland... 12.30

F'dry, by-product, Cincinnati... 11.75

Foundry, Birmingham 8.50

F'dry, by-product, St. Louis $10.75 to $11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export £29 16s. 3d.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth..£16 10s.

Beams, open hearth....£19 10s.

Channels, open hearth...£19 10s.

Angles, open hearth....£15 10s.

Black sheets, No. 24, gage £22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage £25 12s. 6d max.*; £25 12s. 6d. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

All prices set **in bold face type** are maxima established by OPACS on June 24. Other domestic prices are delivered quotations computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	$25.50	$25.00	$26.50	$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	***25.00***	***24.50***	***26.00***	***25.50***	.....
Everett, Mass.	***25.00***	***24.50***	***26.00***	***25.50***	.....
Swedeland, Pa.	***25.00***	***24.50***	***26.00***	***25.50***	.....
Steelton, Pa.	.....	***24.50***	.....	.....	***29.50***
Birdsboro, Pa.	***25.00***	***24.50***	***26.00***	***25.50***	***29.50***
Sparrows Point, Md.	***25.00***	***24.50***	.....	.....	.....
Erie, Pa.	***24.00***	***23.50***	***25.00***	***24.50***	.....
Neville Island, Pa.	***24.00***	***23.50***	***24.50***	***24.00***	.....
Sharpsville, Pa.*	***24.00***	***23.50***	***24.50***	***24.00***	.....
Buffalo	***24.00***	***23.00***	***25.00***	***24.50***	***29.50***
Cincinnati	24.44	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	***24.00***	***23.50***	***24.50***	***24.00***	.....
Granite City, Ill.	***24.00***	***23.50***	***24.50***	***24.00***	.....
Cleveland	***24.00***	***23.50***	***24.50***	***24.00***	.....
Hamilton, Ohio	***24.00***	***23.50***	.....	***24.00***	.....
Toledo	***24.00***	***23.50***	***24.50***	***24.00***	.....
Youngstown*	***24.00***	***23.50***	***24.50***	***24.00***	.....
Detroit	***24.00***	***23.50***	***24.50***	***24.00***	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	***24.50***	.....	***25.00***	***24.50***	.....
Birmingham	***20.38***	***19.00***	***25.00***	.....	.....
Los Angeles, San Francisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah	***22.00***	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....
Toronto	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....***$23.50***

CHARCOAL

Lake Superior fce.....***$28.00***
Lyles, Tenn, high phos. fce..... ***28.50***
Lyles, Tenn., low phos. fce..... ***33.00***
Delivered Chicago..... 31.34

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.05	$3.35	$3.75	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.30	$3.38	$5.10
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.75	4.60	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50	....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63	....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14 999 lbs.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43. **Over 4 in. wide and over 1 in. thick, $4.95.

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North Atlantic States

● **United States Rubber Co., Inc.,** Naugatuck Chemical Division, Naugatuck, Conn., synthetic rubber, etc., has plans by Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., architect and engineer, for new one and multi-story mill near present works for production for government, for which fund of $1,250,000 will be provided by Defense Plant Corp., Washington, for building and equipment. Main offices of parent company are in New York.

Farrel-Birmingham Co., Inc., Ansonia, Conn., machinery and parts, gears, etc., has asked bids on general contract for two-story addition. Cost over $50,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, Conn., is architect and engineer.

Leland-Gifford Co., Inc., 1001 Southbridge Street, Worcester, Mass., drilling, tapping and other machine tools and parts, has let general contract to Albert J. Daniels, 661 Main Street, Shrewsbury, Mass., for one-story addition, for a machine shop. Cost over $70,000 with equipment.

War Department, Washington, has let contract to Matthew Cummings Co., 43 Tremont Street, Boston, on cost-plus-fixed-fee basis, for motor repair works at Fort Devens, Mass., including shops, warehouses, storehouse, maintenance buildings and other structures, at $1,181,814. Frank A. Barbour, Tremont Building, Boston, is architect and engineer.

Storms Drop Forging Co., Storms Court, Springfield, Mass., has asked bids on general contract for three one-story additions, for expansion in main production division, heat-treating plant and for office service. Cost over $85,000 with equipment. McClintock & Craig, Bridge Street, are architects and engineers.

New Britain Machine Co., New Britain, Conn., automatic screw machines and screw machine products, plans expansion in local plant and branch works at Berlin, Conn., for production for government, and will secure appropriation of $650,000 through Defense Plant Corp., Washington, for project.

American Can Co., 230 Park Avenue, New York, has purchased about 30 acres on South Kingshighway, St. Louis, for new plant, consisting of main one-story unit, 620 x 1035 ft., and two adjoining one-story structures, 100 x 375 ft., and 50 x 175 ft., for general service, including machine shop, and for offices, in order noted. Cost close to $2,000,000 with equipment. It is proposed to begin work in August. Present St. Louis plant at 41 Branch Street will be removed to new location on completion. C. G. Preis, first noted address, is company architect and engineer.

Bureau of Yards and Docks, Navy Department, Washington, plans new power plant at Brooklyn Navy Yard for auxiliary service, to be located in Wallabout district. Cost close to $1,000,000 with equipment; also plans expansion and modernization in power facilities and distribution system at same yard, to cost approximately $3,000,000 with equipment. Appropriations are being arranged.

Titanium Pigment Corp., 111 Broadway, New York, an interest of National Lead Co., same address, has let general contract to Wigton-Abbott Corp., 60 East Forty-second Street, for new titanium products plant at Tahawus, Essex County, N. Y. It will comprise several one and multi-story production units, with power house, machine and maintenance shops, storage and distributing buildings, and auxiliary structures. A complete housing development also will be carried out. Cost over $5,000,000 with equipment. Archer E. Wheeler, 25 Broadway, New York, is metallurgical engineer for project.

American Brake Shoe & Foundry Co., 230 Park Avenue, New York, has asked bids on general contract for one-story addition to branch plant at 2001 Laurens Street, Baltimore, for expansion in foundry division. Cost over $85,000 with equipment.

Dahlstrom Metallic Door Co., Buffalo Street, Jamestown, N. Y., metal doors and enclosures, moldings, etc., has let general contract to Olson Co., 311 Lincoln Street, for one-story addition, about 75 x 125 ft. Cost close to $90,000 with equipment. Beck & Tinkham, Bailey Building, are architects.

Chevrolet Motor & Axle Division, General Motors Corp., River Road, Tonawanda, N. Y., will discontinue operations at once in all departments except division for production of rear axles for motor trucks, and will begin conversion of works for production of aircraft motors and parts, for which company has contract from government totaling about $89,075,000. New line of production is scheduled to begin early in 1942. Company also will discontinue operations soon at assembling works at 1001 East Delevan Avenue, Buffalo, and will begin similar conversion of that plant early in August, with Fisher Body Buffalo Division, same address, an affiliated organization, following same program, with installation of new equipment for aircraft motor manufacture noted.

Harrison Radiator Division, General Motors Corp., Lockport, N. Y., plans one-story addition. Cost over $85,000 with equipment. J. M. Tully, Bewley Building, is architect.

Titeflex Metal Hose Co., 500 Frelinghuysen Avenue, Newark, N. J., plans new one-story plant for production of radio equipment for government. Fund of $1,000,000 is being secured through Defense Plant Corp., Washington, for building and equipment.

Air Associates, Inc., Bendix Airport, Bendix, N. J., aircraft equipment and accessories, will begin superstructure soon for one-story addition, about 70,000 sq. ft. floor space, for which general contract recently was let to Brown & Matthews, Inc., 122 East Forty-second Street, New York. Cost about $315,000, of which approximately $180,000 will be expended for equipment.

Pulverizing Machinery Co., 120 Valley Road, Roselle Park, N. J., pulverizing and grinding machinery and parts, has let general contract to Adams-Faber Co., 241 Lorraine Avenue, Upper Montclair, N. J., for new two-story and basement plant, 100 x 200 ft., at Summit, N. J. Cost over $75,000 with equipment.

Crucible Steel Co. of America, Inc., 405 Lexington Avenue, New York, will carry out further expansion in plant at Harrison, N. J., for production of shells for War Department, with installation of equipment to cost about $1,000,000. Fund in that amount will be secured through Defense Plant Corp., Washington This supplements a previous appropriation of $1,500,000 from same source for similar purpose.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in Philadelphia Navy Yard for increased repair facilities, including new shipway, shops and other structures. Cost about $3,000,000 including equipment. Appropriation will be arranged in that amount.

Philadelphia Coca-Cola Bottling Co., Inc., Thirty-third and Reed Streets, Philadelphia, has acquired tract on Hunting Park Avenue, near Thirty-fourth Street, for new one and multi-story mechanical-bottling, storage and distributing plant, to be operated in conjunction with present plant at first noted location, which will be continued. Cost over $500,000 with machinery.

Bryan Engineering Co., Troy, Pa., has approved plans for new one-story plant, about 100 x 100 ft., at 372 Main Street, Dickson, near Scranton, Pa., for production of mechanical equipment. Cost over $60,000 with equipment.

Aero Supply Mfg. Co., Inc., Corry, Pa., aircraft products, has let general contract to Upton-Lang Co., Commerce Building, Erie, Pa., for one-story top addition, 70 x 125 ft. Cost over $85,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has contracted with government for new plant at Lester, Pa., for production of naval equipment, comprising one and multi-story buildings, with auxiliary structures for storage, distribution and other service. Fund of $22,000,000 will be secured through Defense Plant Corp., Washington. Company also has plans for five one-story additions to branch plant at Trafford City, Pa., two of which will be used for expansion in foundry and others for extensions in general production division. Cost close to $500,000 with equipment.

United States Engineer Office, First and Douglas Streets, N. W., Washington, asks bids until July 30 for one-story armament instrument inspection shop at Bolling Field, D. C.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in Navy Yard at Pearl Harbor, T. H., including new shipways, machine shops, construction shops and other structures, for ship repair facilities. Cost about $20,000,000. Appropriation in that amount will be arranged soon. Also will carry out similar extensions at naval base at Vieques, P. R., to cost approximately $5,000,000, and appropriation in that sum is being included in budget.

The South

● **International Harvester Co.,** 180 North Michigan Avenue, Chicago, has leased one-story building, 440 x 790 ft., to be erected by Board of Port Commissioners, New Orleans, near Turning Basin, Inner Harbor navigation canal, for factory branch, storage and distributing plant. Bids are being asked on general contract until July 30. Cost about $750,000 with equipment.

Tuscaloosa Compress Co., Tuscaloosa, Ala., care of S. G. Swaim, Tuscaloosa, head, recently organized, has leased 20-acre tract at West Memphis, Ark., for new cotton compress plant, consisting of main one-story unit, 200 x 1050 ft., and auxiliary structures, with power house and machine shop. Cost over $100,000 with equipment.

Tampa Electric Co., Tampa, Fla., has approved plans for expansion and improvements in steam-electric generating station, including additional equipment. Cost about $1,700,000.

Fort Pierce Growers' Association, Fort Pierce, Fla., has begun erection of one-story addition to fruit-packing plant, 160 x 162 ft., for which general contract recently was let to M. E. Walker, Fort Pierce. Cost over $50,000 with mechanical-handling and other equipment.

War Department, Washington, has authorized new advanced twin-engine flying school at Columbus, Miss., including three hangars, one-story aircraft engine repair works, general utility shop, two bulk gasoline storage units, five storage and distributing buildings, 14 operations buildings, parachute building, paint and oil storage units, administration building and other structures. Cost $4,123,000, of which about $1,842,500 will be used for flying field, and remainder for buildings and equipment.

Crane Co., 836 South Michigan Avenue, Chicago, has approved plans for one and two-story factory branch, storage and distributing plant at Midland and Coral Streets, Lexington, Ky., about 125 x 190 ft. Cost over $85,000 with equipment. Lexington offices are at 375 East Main Street.

Western Electric Co., 1008 Roberts Street, Houston, Tex., telephone wire and cable, etc., plans new one-story factory branch, storage and distributing plant on three-acre tract at

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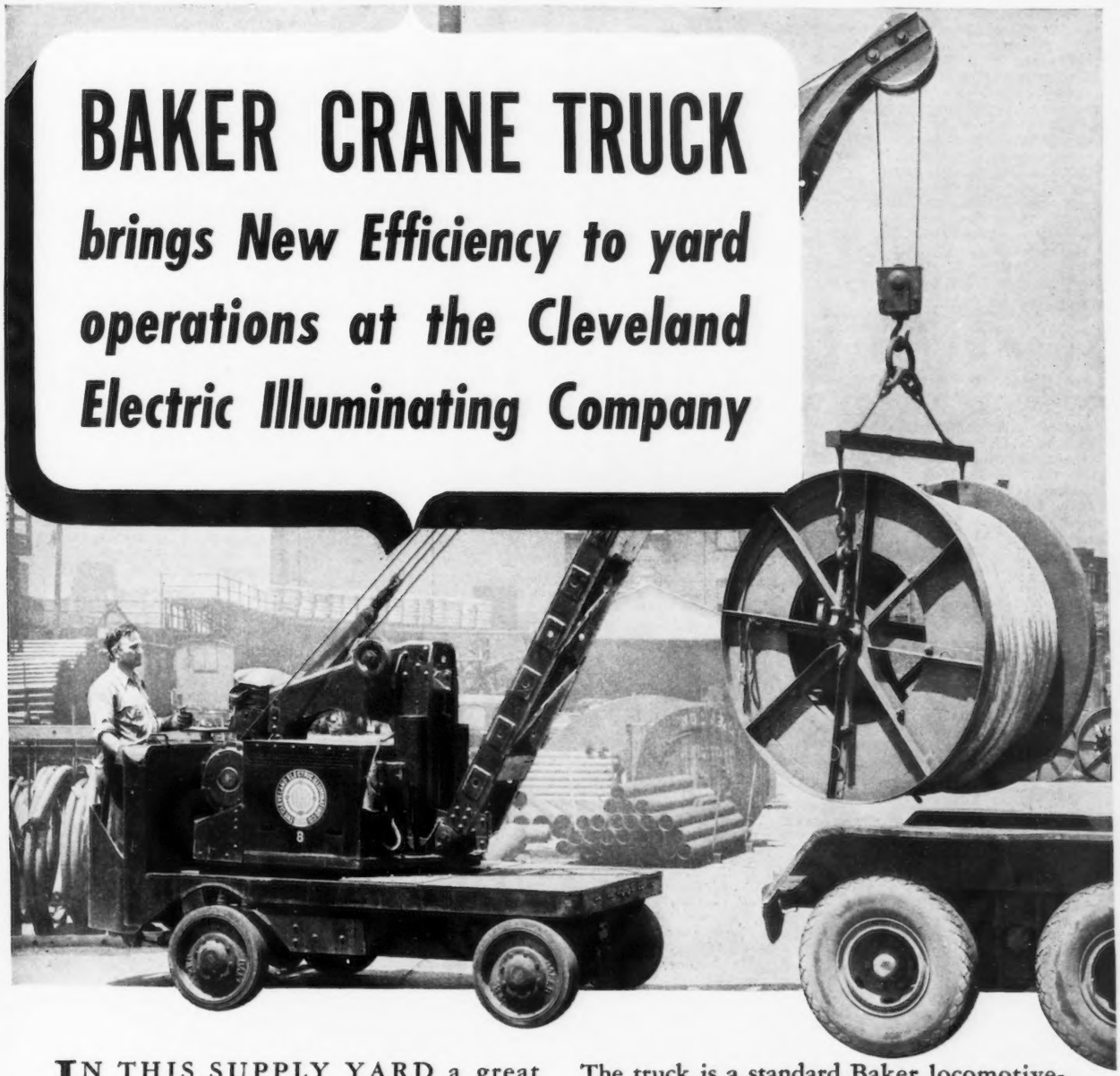

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Lockwood and Critz Streets. Cost over $125,000 with equipment.

Farmers' Electric Generating Corp., Gilmer, Tex., asks bids until July 31 for new steam-electric generating station for power supply for electric rural cooperative organizations in that district; also for transmission line construction. Fund of about $250,000 has been secured through Federal aid. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion at naval air station, Corpus Christi, Tex., including machine shops and other structures for repair facilities. Cost about $500,000 with equipment. Appropriation in that amount is being arranged.

Central States

• **Addressograph-Multigraph Co.**, 1200 Babbitt Road, Cleveland, has let general contract to H. K. Ferguson Co., Hanna Building, for one-story addition, about 125 x 160 ft. Cost close to $175,000 with equipment.

Lodge & Shipley Machine Tool Co., 3055 Colerain Avenue, Cincinnati, plans one-story addition. Cost over $100,000 with equipment. Tietig & Lee, 34 West Sixth Street, are architects; Fosdick & Hilmer, Union Trust Building, are mechanical engineers.

General Motors Corp., Cleveland Diesel Engine Division, 2160 West 106th Street, Cleveland, plans one-story addition, about 25,000 sq. ft. of floor space, for expansion in assembling division. Cost over $100,000 with equipment.

Carey Machine Co., 9510 Cassius Avenue, Cleveland, is erecting one-story addition, 90 x 170 ft., for which general contract recently was let to Sam W. Emerson Co., 1836 Euclid Avenue, for expansion in tool shop. Cost over $70,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has approved plans for expansion at branch plant, Lima, Ohio, consisting of a two-story extension and three one-story additions, with remodeling and improving of present structure. Cost close to $325,000 with equipment.

American Tool & Mfg. Co., Fifth and Main Streets, Urbana, Ohio, tools, dies, gages, etc., plans one-story addition, for which bids will be asked soon on general contract. Cost over $50,000 with equipment.

Twin Coach Co., Kent, Ohio, motor trailers and parts, will take bids soon for new boiler house. Cost about $45,000 with equipment.

Cleveland Chain & Mfg. Co., Broadway and Henry Streets, Cleveland, has asked bids on general contract for one and two-story additions, 40 x 80 ft., and 40 x 60 ft. Cost close to $60,000 with equipment. Edward G. Hoefler, 5005 Euclid Avenue, is architect and engineer.

Black, Sivalls & Bryson, Inc., 7500 East Tenth Street, Kansas City, Mo., pressure vessels, foundry flasks, etc., has let general contract to Rau Construction Co., 2409 Harrison Street, for one-story addition. Cost about $60,000 with equipment.

C. L. Downey Co., 943 Clark Street, Cincinnati, coin counters and kindred specialties, has let general contract to John Martin Construction Co., Hannibal, Mo., for one-story branch plant at Hannibal. Cost close to $50,000 with equipment.

Board of Education, Wichita, Kan., Louis Gerteis, secretary, plans one and two-story vocational school, about 195 x 427 ft. Cost close to $300,000 with equipment. Lorentz Schmidt, 1832 East Second Street, is architect.

Ditzler Color Co., 8000 West Chicago Boulevard, Detroit, paints, fillers, oils, etc., subsidiary of Pittsburgh Plate Glass Co., Pittsburgh, has let general contract to Reisdorf-Brewe Co., Donovan Building, for three-story addition, primarily for a grinding unit. Cost over $85,000 with equipment. Harley & Ellington, Stroh Building, are architects and engineers.

Eureka Vacuum Cleaner Co., 6060 Hamilton Street, Detroit, plans expansion for production of aircraft parts for government, to cost approximately $100,000. Fund in that amount will be secured from Defense Plant Corp., Washington.

United States Rubber Co., 6600 East Jefferson Avenue, Detroit, has let general contract to J. A. Utley, 723 East Ten-Mile Road, Royal Oak, Mich., for one-story addition. Cost over $65,000 with equipment.

Vickers, Inc., 1400 Oakman Boulevard, Detroit, hydraulic pumps and parts, motors and other products, has asked bids on general contract for one-story addition, about 200 x 250 ft. Cost over $150,000 with equipment.

Graham-Page Motors Corp., 8505 West Warren Street, Detroit, automobiles, plans expansion in plant at Dearborn, Mich., for production of marine engine parts for government, with additional machinery and facilities to cost about $900,000. Fund in that amount will be furnished by Defense Plant Corp., Washington. This is in addition to previous agreement with government for manufacture of aircraft parts at Detroit works, with fund of $1,803,000 through same source.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, has let general contract to Barton-Malow Co., 2631 Woodward Avenue, for one-story addition for an oil-recovery unit. Cost close to $50,000 with equipment. Giffels & Vallet, Marquette Building, are architects and engineers.

Simonsen Metal Products Co., 4444 West Chicago Avenue, Chicago, has let general contract to Paul Sather, 2825 West McLean Avenue, for two-story addition, 75 x 123 ft. Cost over $60,000 with equipment. Sivert Klefsted, 6317 Hiawatha Avenue, is architect.

American Flange & Mfg. Co., 825 South Kilpatrick Avenue, Chicago, weldless flanges and kindred products, has let general contract to E. L. Ward, 4722 Arthington Street, for three-story addition, 75 x 285 ft. Cost about $160,000 with equipment. William S. Crosby, 6 North Michigan Avenue, is architect.

J. I. Case Co., 700 State Street, Racine, Wis., agricultural implements and machinery, has asked bids on general contract for one-story addition, 240 x 447 ft., for storage and distribution. Cost over $185,000 with equipment. Frank J. Hoffman, 201 Sixth Street, is architect.

King Midas Flour Mills, Flour Exchange Building, Minneapolis, Minn., has let general contract to Barnett & Record Co., same address, for addition to flour mill at Superior, Wis. Cost over $150,000 with equipment.

Deere & Co., Inc., Third Avenue, Moline, Ill., agricultural machinery and implements, will build two-story addition, 110 x 220 ft., to branch plant at Davenport, Iowa, and not at Moline, as recently noted in these columns. J. H. Hunzinger & Co., Security Building, Davenport, are general contractors. It will be equipped for expansion in foundry. Cost about $150,000 with equipment.

Raulard Corp., 3333 West Belmont Avenue, Chicago, radio equipment and parts, has let general contract to Clearing Industrial District, Inc., 38 South Dearborn Street, for new one-story plant, 175 x 235 ft., at 4245 Knox Avenue, Clearing Industrial District. Cost over $175,000 with equipment.

Western States

• **Hard Chrome Engineering Co.**, 1051 East Slauson Avenue, Los Angeles, special metal products, has asked bids on general contract for new one-story plant at 1717 East Slauson Avenue, 60 x 100 ft. Cost close to $50,000 with equipment. Blake E. Beatty, Architects' Building, is architect.

Bureau of Yards and Docks, Navy Department, Washington, plans expansion at Mare Island Navy Yard, Vallejo, Cal., for increase in ship repair facilities, including shipways, machine shops, and other structures. Installation will include traveling cranes, hoists and other mechanical-handling equipment. Cost about $5,000,000. Appropriation in that amount is being arranged. A similar program will be carried out at Puget Sound Navy Yard, Bremerton, Wash. Cost estimated at $3,000,000, in which amount appropriation will be arranged.

American Forge Co., 750 Potter Street, Berkeley, Cal., iron and steel forgings, plans one-story addition. Cost close to $50,000 with equipment.

A. Anderson and E. Carlson, 800 East Gage Avenue, Los Angeles, have let general contract to Lee Construction Co., 2139 West Manchester Avenue, for new one-story machine shop, 24 x 175 ft., at 808 East Gage Avenue. Cost about $45,000 with equipment. F. O. Reyenga, 4707 Sixth Avenue, is engineer.

Constructing Quartermaster, Ordnance Department, Ogden, Utah, plans expansion in Ogden ordnance depot, including machine shops, main one and multi-story ordnance buildings, and other structures. Cost $4,900,000 for buildings and equipment. Appropriation in that amount has been authorized.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until July 29 for one motor-driven engine lathe for naval air station, San Diego, Cal. (Schedule 7948); until Aug. 1, four electric arc welding sets, 56 arc welding panels and spare parts (Schedule 7931), for Mare Island yard, Vallejo, Cal.; four motor-driven automatic screw machines (Schedule 7976); until Aug. 5, one motor-driven surface grinder, one set of grinding wheels, chucks and rings, one demagnetizer and one electric wheel mounter (Schedule 7977) for Puget Sound yard, Bremerton, Wash.

Canada

• **National Steel Car Corp., Ltd.**, Kenilworth Avenue North, Hamilton, Ont., has approved plans for new plant at Malton, Ont., with main two-story machine works, 200 x 500 ft., and one-story adjoining structure, 50 x 200 ft., for office and general service. Cost over $1,000,000 with equipment. This is part of larger plant to be built at same location for aircraft production, entire project to cost over $2,000,000 with machinery.

Enterprise Foundry Co., Ltd., Sackville, N. B., iron castings, plans one-story addition. Cost close to $60,000 with equipment.

Pere Marquette Railway Co., General Motors Building, Detroit, has let general contract to Johnson Brothers, Ltd., Aylmer, Ont., for new engine house with shop facilities at St. Thomas, Ont., with turntable, coaling dock and other structures. Cost close to $350,000 with equipment.

Andrew's Wire Works, Ltd., Watford, Ont., plans one-story addition, 85 x 125 ft. Cost about $80,000 with equipment.

Allied War Supplies Corp., Ltd., 420 Lagauchetiere Street West, Montreal, will proceed with erection of new plant in province of Quebec for which site has been cleared. Dufresne Construction Co., Ltd., 1832 Pie IX Boulevard, Montreal, has general contract. Cost about $300,000.

United Steel Corp., Ltd., Welland, Ont., has started work on plant addition to cost about $100,000 with equipment. Gardiner Construction Co., Ltd., River Bank Street, Welland, is general contractor.

Walker Metal Products, Ltd., 1511 Kildare Road, Windsor, Ont., will build plant addition to cost $42,000, equipment extra. Hein Construction Co., 172 Aylmer Avenue, is general contractor.

Saskatchewan Power Commission, Saskatoon, Sask., has appointed Webster & Gilbert, C.P.R. Building, architects, to prepare plans for addition to power plant to cost about $100,000 with equipment. A. L. Cole is plant superintendent.

British American Oil Co., Ltd., Royal Bank Building, Toronto, has plans for an oil refinery on Lake Shore Road, west of Toronto, to cost $4,500,000.

Ingraham Canadian Clock Co., Ltd., 411 Clendennan Avenue, Etobicoke Township, Ont., has awarded general contract to Gatehouse Bros., Ltd., 989 Bay Street, Toronto, for a factory to cost about $75,000 with equipment. John B. Parkin, 1104 Bay Street, Toronto, is architect.

Port Hope Sanitary Mfg. Co., Ltd., Port Hope, Ont., has awarded general contract to B. Pennington & Son, Ontario Street, Port Hope, and structural steel contract to John T. Hepburn, Ltd., 18 Van Horne Street, Toronto, for plant addition to cost $40,000.

Francoeur Gold Mines, Ltd., C. D. H. MacAlpine, Concourse Building, Toronto, president, has let general contract to Hill-Clark-Francis, Ltd., Ninth Street, Noranda, Que., for cyanide mill at Arntfield, Que., to cost $250,000.